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# The Marine Observer

*A quarterly journal of Maritime Meteorology*

Volume XXXV No. 209

July 1965

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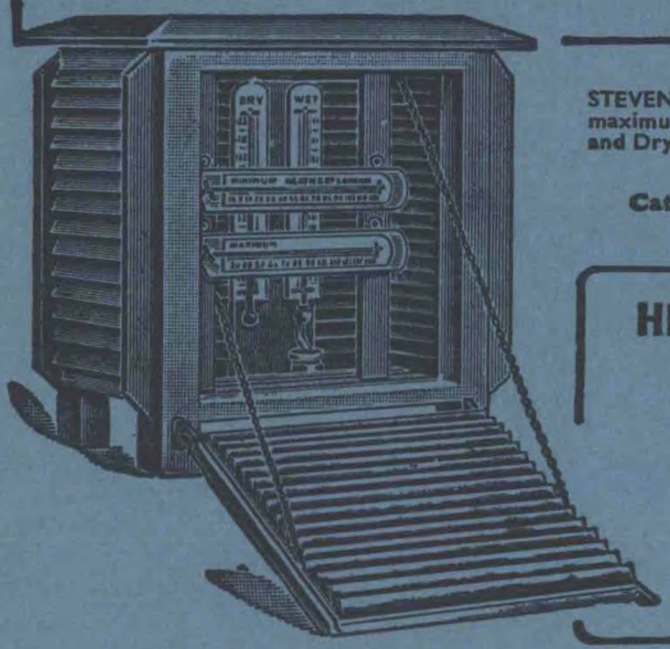

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The range of wind speed and the mean wind speed are quoted for each force; the description of the sea according to the 'Sea Criterion' laid down by the World Meteorological Organization is also given.

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Met.O. 764

# THE MARINE OBSERVER

A QUARTERLY JOURNAL OF MARITIME METEOROLOGY PREPARED BY THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE

VOL. XXXV No. 209 JULY 1965

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*Letters to the Editor, and books for review, should be sent to the Editor, "The Marine Observer," Meteorological Office, London Road, Bracknell, Berkshire*

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# Editorial

Most of us who have been at sea during the last 50 years or so and who served our time in steam have, at some time or other, been told in no uncertain terms that we would be better seamen if we had been trained in sail. It will not be long now, however, before there are no British seamen alive who served their time in sail, so perhaps this controversy about the relative merits of steam or sail training will die a natural death—although the admirable activities of the Sail Training Association may manage to keep it alive in this country, which is perhaps a good thing as it may discourage complacency.

It is worth remembering that in several traditionally maritime countries, sail training for professional seamen is still considered well worthwhile—and some of these countries seem to be showing somewhat more maritime enterprise than is evident in this country; for example the Scandinavian car ferries now operating from Southampton to Cherbourg.

The technical advantages of sail training compared with the more conventional and academic present-day training to a deck officer serving in a modern steamship or motor-ship would probably be very small indeed, because his duties and responsibilities are so different from those of the sailing-ship man. The great value of sail training seems to be in building up character and physical fitness, and in teaching self reliance and improvisation. Apart from his skill in the ancient arts of 'sailorising' (and the modern seaman still needs some skill in this), self reliance was perhaps the outstanding attribute of the mariner before the steamship and radio came on the scene.

The safe and economical operation of a sailing ship depended very largely upon the personal skill and experience of her master in handling her and in taking every advantage of favourable winds and currents. With no radio, the only idea he would have of the weather he was likely to meet on any particular passage would be a rather vague climatological one, largely based on his own previous experiences, the meagre information available in *Admiralty Pilots* and other publications of those days and what he could glean from conversations with other shipmasters in ports abroad. After all, the weather was what he was primarily interested in, for it provided his motive power; but when unfavourable was much more his dreaded enemy than it would be to the master of a power-driven vessel. He could, of course, and often did have success as a 'single observer-forecaster' by an intelligent use of the barometer combined with keeping a 'weather-eye lifted'. It was not unusual for a particular sailing ship to arrive at her destination two or three weeks ahead of other sailing ships capable of a similar performance, which had left the same port of departure at about the same date. These achievements were due to the exceptional seamanship and weather wisdom of that particular master combined with the sailing qualities of the ship herself. The sailing ship had no power aboard, shore lights were relatively few in number and not very powerful, compasses and other navigational equipment were rudimentary, so her master had plenty of limitations—lead, log and lookout were more than a must! It is surprising, perhaps, that he got by as well as he did and that casualties were not greater than they were—all this goes to show that we should take off our hats to the sailing-ship man.

The arrival on the scene of the early steamship eased some of the shipmster's problems; despite the low power, he could, at least, avoid being swept on to a leeshore. But steam brought its problems—for risk of collision in fog with its generally attendant light winds was obviously less with only sailing ships than when steamers came on the scene.

In 1861, when in coastal waters, the mariner acquired a slight benefit from the first visual storm-warning signals (when he could see them!). But the chief value of these visual signals was probably in warning him of impending storms when he was lying at anchor or in port and about to sail.

Since 1901, when Marconi's wireless telegraph was operationally installed aboard

the first British merchant ship, prospects for safety at sea have steadily improved—advances in wireless technique have been accompanied by enormous improvements in navigational equipment and techniques, and in the design of ships and of their equipment. Thus, in many respects, with so many aids to safe navigation at his disposal, the task of the shipmaster has been very much eased. In other respects—greater speeds, larger and far more valuable ships, and somewhat more congestion in the 'sea lanes' (*Lloyds Register* tells us that there are about 41,000 ships in the world now compared, for example, with 35,000 in 1886)—his difficulties have increased. And casualty figures are still disconcertingly high. High speeds combined with the human elements have shown that radar is not always an entire boon to the shipmaster.

One of the obvious products of constant communication by radio is that the shipmaster can, each day, receive a regular series of weather forecasts. Nowadays, thanks largely to the radio weather messages which voluntary observing ships send regularly to the shore, weather bulletins of some kind or other are issued by radio by various shore authorities for most of the oceanic and coastal sea areas of the world. For oceanic areas, the bulletin normally contains, in addition to storm warnings and a forecast, a statement of the existing weather situation and a coded analysis and selection of shore station and ship reports whereby a simple 'actual' weather map can be drawn aboard the ship. In some cases a coded 'prognostic' is issued, whereby a forecast map can be prepared aboard the ship.

A fairly recent improvement in meteorological communication has been the use of facsimile apparatus whereby a complete map showing actual and forecast weather conditions over a large oceanic area in pictorial form is broadcast by radio at (say) 6-hourly intervals; these maps can easily be received by quite simple apparatus aboard any merchant ship.

Reception of such a map aboard ship would take on an average about 10 minutes. In addition to actual and forecast weather maps, facsimile maps of actual and forecast wave conditions and of ice conditions are also regularly transmitted by certain meteorological services in both hemispheres. These maps represent a great step forward; not only do they save rather a lot of tedious work by the ships' officers but their reception is independent of 'single operator' watches and they are issued so frequently that a shipmaster has before him a more or less constant 'picture' of the weather situation as seen by the meteorologist. At present facsimile has not been fitted in many merchant ships but the number of ships so fitted is gradually increasing.

Consequently, if one accepts the occasional inaccuracies of the forecast, the shipmaster can have more or less constantly before him, nowadays, a reasonable appreciation of the type of weather he can expect. Any inaccuracies will tend to be smoothed out due to the frequency with which the maps can be received and sudden changes in the weather situation likely to affect the ship will be quickly brought to his attention.

One might ask, "What is the practical value of knowing what the weather is ahead when the ship has to proceed through it whether it be good or bad?" The answer probably lies in some form of weather routing, for with the aid of facsimile, combined with the speed of the modern ship, the shipmaster has the possibility of taking action to avoid the worst of the weather ahead of him much more frequently than was possible in the past by altering course or speed or both. Obviously there are cases when no avoiding action can be taken. No matter how large or strongly built she may be, a ferocious sea can still do a lot of damage to a ship, her equipment or her cargo, even if the safety of the vessel herself and her crew are not affected—ships and their cargoes are so valuable nowadays that anything that can be done to avoid damage is all to the good.

A study of the relevant weather maps and the weather information that was issued by radio at the time of some incidents in the western North Atlantic during the past twelve months or so, involving loss or damage to merchant ships in very

heavy weather, poses the question as to whether the masters of those ships would have been in a better position to have taken action to avoid the worst of the weather if there had been a facsimile receiver on board. This question does not imply any criticisms of the masters or owners of ships concerned—despite the availability of meteorological information, avoiding action might neither have been prudent nor practicable in the circumstances and ships are, after all, built to withstand almost any weather; the master alone can decide as to whether a drastic deviation is desirable in an endeavour to avoid high seas, bearing in mind the safety of the ship and economic considerations.

In one of these incidents, it did appear that if the ship had been fitted with a facsimile receiver, the master would have had before him, with the resulting weather maps, and written forecasts and storm warnings received by W/T, such a clear pictorial representation of the weather situation liable to affect his ship that he might have been inclined to have altered course drastically to the southward in an endeavour to get away from the influence of a deep depression which was then about 600 miles to the westward of the ship, moving north-easterly and deepening. If he had felt this was the wisest course, he would no doubt have been prudent to consult the U.S. Weather Bureau by radio. If he had taken this action, he would still have encountered very violent winds but it seems that the further he could have got to the southward the further he would have been from the centre of the depression and the greater the likelihood of the wind and sea decreasing.

In another instance that was studied, it seemed that the mere possession of facsimile maps would not have helped very much; it so happened on this occasion that the storm, which was very violent, was moving much faster than was anticipated by the meteorologists, and if the master had taken avoiding action merely on the forecast movement of the storm's centre, either from the written forecast and storm warning or from the facsimile analysis and prognostic maps, he might have got into worse trouble. In this case also the storm was exceptionally severe and here again if the master did envisage taking avoiding action, prior consultation with the meteorological authorities ashore would probably have been helpful. If a shipmaster is in doubt or difficulty about interpreting a forecast, the meteorologist ashore (irrespective of nationality) is always ready to give expert advice by radio—merely at the cost of the message itself.

One might ask whether, in both these instances, a coded analysis could have been plotted aboard the ship and whether that, associated with the storm warnings and the radio weather bulletins, could have provided the same answer as the facsimile maps. Plotting a coded analysis is a relatively lengthy business and unlikely to be really practical at 6-hourly intervals (even if it were issued as often as that) aboard a ship in storm conditions, when the ship's officers are obviously occupied with other duties. Even if this had been done, it would not have provided anything like the information contained on the professional facsimile map which shows both an analysis and the forecast at 6-hourly intervals.

The study of these incidents does not teach any specific lesson in meteorology or seamanship; it merely tends to indicate one way in which the meteorologist, aided by facsimile maps and radio weather bulletins, might be able to ease somewhat the problem of the shipmaster in difficult and potentially dangerous situations.

C. E. N. F.

# Report of Work for the Year ended 31st December 1964

## (MARINE DIVISION AND MARINE CLIMATOLOGY SECTION OF THE METEOROLOGICAL OFFICE: VOLUNTARY OBSERVING FLEET AND OCEAN WEATHER SHIPS)

### 1. Voluntary Observing Ships

The British Voluntary Observing Fleet is comprised as follows (the numbers being the monthly averages during the year):

(*a*) 499 Selected Ships which are supplied on loan with a full set of meteorological instruments and which make observations in code form FM21.C every 6 hours and transmit them to the appropriate coastal radio station wherever their voyages take them.

(*b*) 52 Supplementary Ships which make less detailed observations than Selected Ships and are supplied on loan with only a barometer, air thermometer and screen. They use abbreviated code form FM22.C for their messages.

(*c*) 124 coasting ('Marid') vessels, and one lightship, which make sea surface temperature observations in U.K. coastal waters and transmit them in a special code by W/T or R/T. When in the North Sea, the coasting ships include in their messages wind, weather and visibility observations.

(*d*) 13 lightships which make observations of wind, waves, visibility, air and sea temperatures; 11 of these send coded reports by R/T, the other two only record their observations for climatological purposes. The *Dowsing*, *Galloper* and *Royal Sovereign* lightships report barometric pressure using the precision aneroid, and their reports are included in the BBC 5-minute weather bulletins for shipping. The *Galloper* also reports barometric tendency. The time limit imposed on BBC weather bulletins does not permit the inclusion of the barometric tendencies of the other two lightships.

(*e*) 12 trawlers which make non-instrumental observations only and transmit them by W/T or R/T using the first four groups of FM21.C, to radio stations in the U.K., Canada, Iceland, Norway or U.S.S.R. depending on the area in which they are fishing. In addition to these, 4 trawlers now figure in the Supplementary Ships' List.

(*f*) 57 Auxiliary Ships which make and transmit visual observations similar to those made by trawlers, with the addition of pressure and air temperature readings from the ships' own instruments (using the 'Shred' code). These ships only do this work when in areas where shipping is known to be sparse.

This total of 757 ships represents nearly 19 per cent of the world's total of about 4,000 voluntary observing ships. The total tonnage of U.K. shipping at present is about 12 per cent of the world total and the total number of British ships is about 11 per cent of the world total—so whatever way one looks at it, the British contribution to the voluntary observing ship scheme is appreciable.

The increasing importance of Hull as a port and the need to secure the goodwill of the distant-water fishing fleets operating from the Humber made it desirable to station a full-time Port Meteorological Officer there. Following the death of Lieut.-Commander Carr, the Merchant Navy Agent at Hull, Lieut.-Commander Pullan moved from Southampton to become Port Meteorological Officer at Hull. Southampton now has a part-time agency as it had before 1948, and Commodore D. M. McLean is the Merchant Navy Agent there.

Port Meteorological Officers at Cardiff, Glasgow, Hull, Liverpool and London and Merchant Navy Agents at Leith, Newcastle and Southampton have between

them endeavoured to visit each British observing ship once every 3 months. During these visits, instruments are inspected and renewed as necessary, the work is discussed with observing officers and radio officers, and newly joined officers are instructed in the ways of observing. During the year several ships have been sold abroad at very short notice and we are indebted to the many Port Meteorological Officers in British Commonwealth ports who have withdrawn our instruments and arranged their passage home to us before the sale of these ships. A small stock of our instruments continues to be kept by the Port Meteorological Officers in Bombay, Calcutta, Hong Kong, Madras and Singapore for the use of British observing ships which are away from the U.K. for long periods. These have been found very useful.

The British Voluntary Observing Fleet includes ships of over 100 shipping companies and the following table shows the variety of trade routes on which they are engaged:

**Table 1. Average numbers of British Selected and Supplementary Ships on main trade routes to and from the U.K.**

| | | | |
|---|---|---|---|
| Australasia | 107 | South America | 40 |
| Far East | 85 | Pacific Coast of North America | 12 |
| Persian Gulf | 31 | Europe | 39 |
| South Africa | 44 | Falkland Islands and Antarctic | 2 |
| North Atlantic | 91 | World-wide 'tramping' | 70 |
| West Indies | 30 | | |

The map opposite shows the position of British Selected Ships in various parts of the world on 20th May 1964 (a day picked at random).

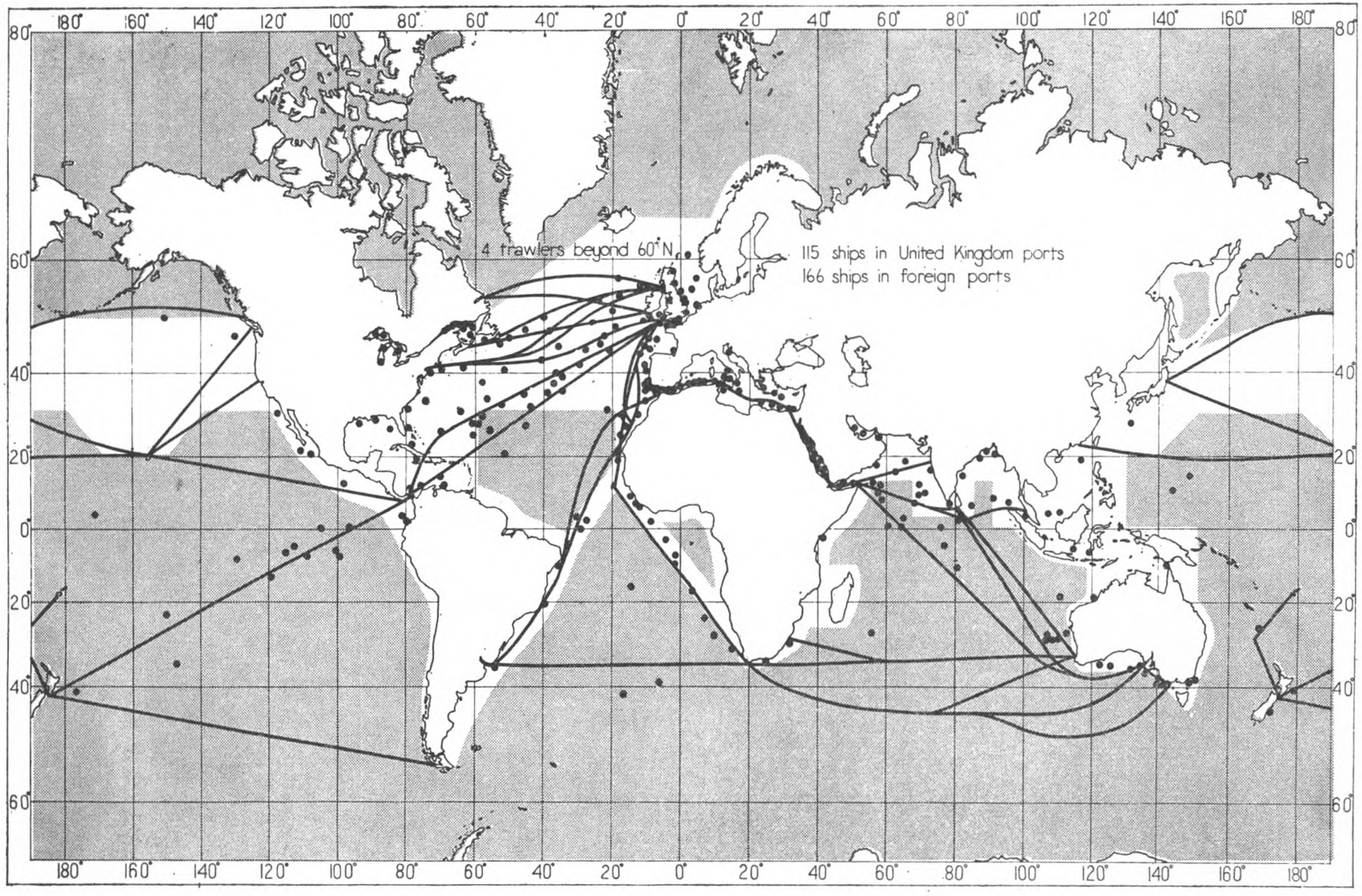
The following table gives the average daily number of radio weather messages received at the Meteorological Communications Centre at Bracknell via GPO coastal stations during the year from merchant ships.

**Table 2. Daily average number of reports received direct from ships**

| | |
|---|---|
| (*a*) North Atlantic (east of 40°W and north of 35°N) | |
| U.K. Selected and Supplementary Ships | 92 |
| 'Marid' ships (coasting vessels) | 12 |
| Foreign ships | 19 |
| Trawlers | 5 |
| Total | 128 |
| (*b*) North Sea (51° 30'N to 61°N and 4°W to 7° 30'E) | |
| U.K. Selected and Supplementary Ships | 8 |
| 'Marid' ships (coasting vessels) | 5 |
| Trawlers | 2 |
| Total | 15 |
| (*c*) Light-vessels | 34 |

During two typical days, one in June and one in December, the total number of reports from ships received in the Central Forecasting Office at Bracknell from various sources are shown in Table 3.

The figures for the eastern North Atlantic and European waters—averaging about 660 reports a day compared with 570 a day in 1963—are impressive, but they cover a very large oceanic area, and need to be divided by four to present a true picture for any synoptic hour. In this area the 0000 and 0600 GMT charts have, almost invariably, very few ships' observations on them. This is because the majority of observing ships carry but one radio officer who is, in accordance with the internationally agreed radio watchkeeping periods, not on watch at the time that these observations are made. Many more ships, however, are becoming aware of the value of both the 0000 and 0600 observations to the forecaster even when they are transmitted after 0800, when the 'single-handed' radio officer comes on watch.




The positions of U.K. Selected and Supplementary Ships on 20th May 1964, a day picked at random. The shaded areas are those in which shipping is sparse, and in which Auxiliary Ships make reports.

**Table 3. Total number of reports received by various sources from ships during two typical days in the year**

| | | June | Dec. |
|---|---|---|---|
| Direct reception from | British ships in eastern North Atlantic | 84 | 82 |
| | Foreign ships in eastern North Atlantic | 41 | 23 |
| | British trawlers in North Sea | 2 | 7 |
| | British merchant ships in North Sea | 3 | 4 |
| Total (direct reception) | | 130 | 116 |
| Via other European countries | Ships in eastern North Atlantic | 370 | 357 |
| | Ships in Mediterranean | 101 | 71 |
| | Ships in North Sea | 37 | 32 |
| | Ships off north Russia | 4 | 9 |
| | Ships in other European waters | 47 | 43 |
| Grand total (eastern North Atlantic and European waters) | | 689 | 628 |
| Via U.S.A. | Ships in western North Atlantic | 497 | 418 |
| | Ships in North Pacific | 412 | 494 |

It is most encouraging to notice the number of North Atlantic traders which are now sending all four observations by radio. Studied in conjunction with the map on page 101 the meteorological network in the eastern North Atlantic seems to be fairly reasonable, apart from the inevitable gaps where shipping is always rather sparse.

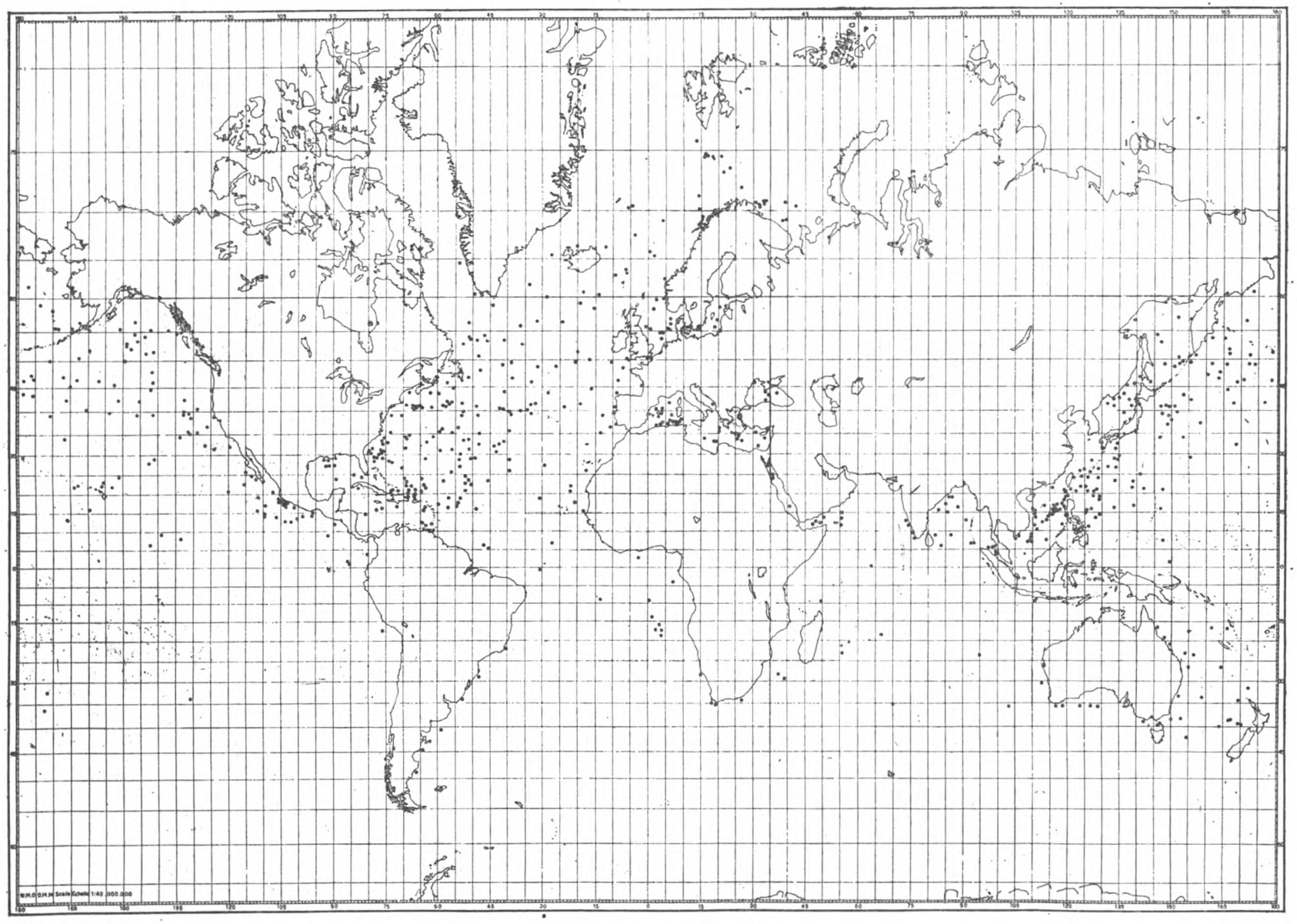
More reports from ships in the North Sea would be very useful, not only from regular traders but from foreign-going ships which frequently have their first discharging port in north-west Europe. We realise that in this area, ships' officers are busy with navigation duties but we make a special point of asking all voluntary observing ships to send radio weather messages from there, however short the circumstances demand that they shall be, whenever possible.

British trawlers have again provided useful non-instrumental observations but many more are required to satisfy the requirements of the forecasters for information from all the areas in which these vessels operate; none of these areas see many ships in the normal way. The average number of non-instrumental trawler reports received at U.K. radio stations was 176 a month, while the total number of reports these ships sent to foreign stations was 90 per month. These figures are a considerable reduction on those for 1962 and 1963, accounted for by the fact that during the year four trawlers which had hitherto been most prolific in this way were equipped with instruments as Supplementary Ships and consequently now have their observations included in Table 1. The recruitment of trawlers as Supplementary Ships is a new venture, made possible because more of the precision aneroid barometers are now available, and the results obtained have amply justified the decision.

Scrutiny of the logbooks shows that our ships regularly transmit their observations to the appropriate radio stations in other parts of the world. Table 3 above and the map on page 101 give some indication of the resulting network. This map, which was prepared for the Fourth Session of the Commission for Maritime Meteorology, shows the world network of reports received by various meteorological authorities from ships of all nations on 1st July 1963; although for a different year than that covered by this report, it does give a general indication of the world 'picture' and it certainly emphasises the areas where shipping is relatively sparse.

1054 meteorological logbooks were received during the year from ships of the Voluntary Observing Fleet and examination of them shows that the customary high standard of observing has been well maintained.

177 completed forms have been received during the year from Auxiliary Ships. The majority of these observations continue to come from the Indian Ocean though many other sparse areas are included. In this connection, particular mention should be made of the tanker companies whose ships nowadays visit parts of the world almost unheard of only a few years ago. Their response to our request for observations from these little-known areas has been magnificent.



Distribution of ships of all nations from which radio weather messages for 0000 GMT were received on 1st July 1963, a day picked at random. Only radio weather messages from ships received direct at national coastal stations are plotted—not messages relayed from other countries.

The number of Selected and Supplementary Ships remains about the same as in 1963; there have been several changes with ships being sold or going in for a long lay-up but whenever a deletion is made there is never any lack of volunteers to fill the vacancy.

The variety and detail of the natural phenomena (some of which are quite unique) recorded in the additional remarks column of the meteorological logbook reflect the conscientious way in which our voluntary observers make their observations. And the care with which the logbooks are written up and the amount of detail they contain gives further evidence of this. Any 'special' observations which are outside the competence of the Meteorological Office are forwarded to an appropriate expert for comment; the more interesting of these are published in "The Marine Observers' Log".

There have been some minor changes in the wording of the radio weather bulletins issued by the BBC and through GPO coastal stations with a view to simplification; these changes involve the omission of repetitive words such as wind, visibility, etc., and enable the more important detail to be clarified.

Several British ships are now known to be fitted with facsimile receiving apparatus, whereby they can receive actual and forecast weather maps direct by radio and thereby avoid having to plot these maps aboard the ship from the coded messages.

The increasing number of shipmasters and officers who visit the Meteorological Office at Bracknell during their leave is an encouraging sign of their awareness of the practical value of meteorology to seamen. Parties of cadets undergoing their pre-sea training, parties of cadets undergoing a mid-apprenticeship release course and parties of shipmasters and senior officers undergoing a Senior Officers' Refresher Course have been among our visitors during the year.

## 2. Ocean Weather Ships

British Weather Ships completed their 17th year of service in the North Atlantic during the year. The 'Castle' class frigates, which replaced the former 'Flower' class vessels between 1958 and 1961, continue to prove suitable for their present duty, and reasonably economical to operate. Their maintenance and repair costs, for example, at an average of about £11,000 per ship per annum are little different from the average in 1955, despite rising shipyard costs.

Routine hourly surface observations and 6-hourly upper air observations have continued aboard these ships throughout the year. Stormy weather never deters the meteorologists from attempting to launch the upper air balloons; it is very seldom they fail to do so because of weather conditions. Tracking the balloon by radar in severe weather requires great skill and concentration on the part of the Radio Technicians who perform this duty; the ships are very lively in rough seas. These ships frequently encounter gale force winds on most days of their spell of duty on station during the winter months.

Oceanographic work has continued throughout the year. Four soundings to a depth of about 3,000 metres are made each voyage to obtain sea temperature and salinity at specified depths. Bathythermograph soundings to a depth of 275 metres have been made twice daily while on station and at 6-hourly intervals on passage. The deck officers do the deep soundings and the meteorologists the bathythermograph observations—a co-operative effort! Routine biological work has continued on behalf of the Ministry of Agriculture, Fisheries and Food, and the Department of Agriculture and Fisheries for Scotland. Line fishing for red fish at certain times of the year by the ship on station 'Alfa' is another activity of the weather ships, carried out for the Scottish Marine Biological Association.

*Weather Reporter* and *Weather Monitor* when on duty at station 'Juliett' took part in a special oceanographic survey in the eastern Atlantic in September. 522 hourly bathythermograph soundings were made aboard these two ships during this period. They also provided navigational assistance for other ships taking part in the operation and had the difficult task in the severe weather conditions, which prevailed for

most of the month, of watching and maintaining a special marker-buoy. (See the article on page 130.)

Total short-wave solar radiation and radiation balance observations were continued by all four ships. These observations are also made by two RN survey ships, and the R.R.S. *Discovery*, *Shackleton* and *John Biscoe.*

Observations to check the accuracy of the equivalent wind speed in knots of the Beaufort scale of wind force were completed during the year aboard the ocean weather ships.

The average radar-wind height attained by the weather ships during the year, using the 1,000 gram and double 500 gram balloons was 67,000 feet. Experiments are being made with a new type of balloon with a view to obtaining observations to greater heights.

On 31st May a boiler-room fire at sea aboard *Weather Adviser* while on passage to ocean station 'Juliett' resulted in fatal injuries to two firemen and fairly extensive damage to the ship. But for prompt action in smothering the fire with $CO_2$ gas the consequences would, without much doubt, have been very much more serious. Steam was very quickly raised in the other boiler and the ship returned to harbour—but spent the whole of the remainder of the voyage there, under repair. Resulting from this fire certain additional safety precautions have been taken.

During the year aircraft of RAF Coastal Command have, whenever possible, continued to carry out air/sea rescue exercises with weather ships on station; the opportunity is then taken to drop newspapers and mail. These 'Methop' exercises, during which the aircraft simulates a radar controlled 'ditching', provide extremely useful and realistic exercise and obviously they are popular with the ships.

On 9th–10th June *Weather Reporter*, while on duty at station 'Juliett', was involved in an air/sea rescue incident, in which the pilot of a U.S. fighter aircraft ejected into the sea about 20 miles away from the ship. Unfortunately the pilot was dead when he was taken aboard the ship.

On 8th May, *Weather Reporter* on station 'Juliett' assisted a Swedish ship for 9 hours in an unsuccessful search for a man lost overboard.

The weather ships had the distinction during the year of being awarded the 'Hunt' Trophy, an inscribed silver tray, awarded annually by the Guild of Air Traffic Control Officers to the individual or organization considered to have made the most outstanding contribution to Air Traffic Control.

## 3. General

By arrangement with the National Institute of Oceanography R.R.S. *Discovery* on her second voyage to the Indian Ocean was supplied with radiosonde equipment as a contribution to the International Indian Ocean Expedition. A Scientific Assistant from the Meteorological Office, who had had ocean weather ship experience, sailed in the ship to do this work. 136 successful radiosonde ascents were made and the results transmitted by radio during the 119 days that the ship spent at sea in the Indian Ocean. It was found surprisingly easy to inflate the balloons without using the temporary balloon shelter with which the ship is provided. Routine surface observations were also made at 3-hourly intervals by the ship's officers, assisted by the meteorologist, throughout the period *Discovery* spent in the Indian Ocean, and were transmitted by radio. Autographic records of air and sea temperature, humidity and solar radiation were also obtained.

## 4. Ice

The Marine Division continues to publish the monthly ice map of the North Polar Basin and areas adjacent to the North Atlantic; a map of the ice situation is also produced every 10 days which is widely used, not only in this country but also in many parts of Europe and North America. Ice reports are received from many

sources including the Royal Dutch Air Lines (K.L.M.), the U.S. Weather Bureau in Alaska and the Royal Dutch Meteorological Institute.

Advice has been given to British shipping and trawling interests and a number of scientific institutions on request concerning the development of sea-ice in all sea areas adjacent to the North Atlantic Ocean.

## 5. Surface Ocean Currents and Waves

Work continued in co-operation with the ocean weather ships, H.M. survey ships and merchant ships to improve methods of measuring surface ocean currents and steady progress has been made in punching current data on to cards for rapid processing by the electronic computer in due course.

At the request of the British Ship Research Association who, on two occasions, carried out sea-keeping trials aboard merchant ships specially instrumented for the purpose, daily wave forecasts for 24 hours ahead for specified positions in the North Atlantic were prepared and issued by radio during the period that the vessels concerned were in that ocean.

## 6. Enquiries

The number of enquiries dealt with during the year was slightly larger than in 1963 and covered the usual wide variety of interests: those from solicitors, insurance and shipping companies far outnumbered other classes of enquiry. A considerable number of requests for wave data were again received from engineers interested in drilling for oil and gas under the North Sea. Similar information was provided for the Persian Gulf and Western Australia in connection with the operation of hovercraft. Engineers engaged in off-shore construction work in the Mediterranean and Adriatic Seas, off the west coast of India and in the Persian Gulf, as well as in home waters, were also provided with wave data. The Ministry of Transport was supplied with weather information on 12 occasions for presentation at Courts of Enquiry into shipping casualties. Information about gales and tropical storms in various parts of the world was provided in connection with the preparation of the new International Loadline Convention for Shipping. Surface ocean current and sea-ice data were supplied to the Hydrographer for revision of six volumes of *Sailing Directions*, and for insertion on certain navigational charts.

## 7. Publications

*The Marine Observer* was published quarterly.

The 6th Edition of *Ships' Code and Decode Book* (Met.O.509) was issued.

A new (2nd) Edition of *Meteorology for Mariners* (Met.O.593) was put in hand and it is intended that it be published during 1965.

## 8. Awards to Voluntary Observing Ships

Awards were made, as customary, to the master, principal observing officer and senior radio officer of the hundred Selected and Supplementary Ships which had sent in logbooks during the year which were assessed to have been the most careful and painstaking of all the logbooks received. Similar awards were made to the officers of four ships in the coastwise and short sea trades ('Marid' ships) for the consistency of their sea temperature observations and also to the four trawler skippers and wireless operators whose work for us in high latitudes was classed as deserving of special recognition. The books selected for awards were *The Merchant Navy, a Social History*, by Captain A. G. Course, and *The University Atlas.* Barographs were presented to four shipmasters for their long and zealous meteorological work at sea.

## EXCELLENT AWARDS, 1964–65

On pages 106 to 109 in this issue of *The Marine Observer* appears the list of ships, masters and officers who have gained Excellent Awards for the quality of their meteorological logbooks received during the year ended 31st March 1965 and once again we have the pleasant task of congratulating the masters and officers named in it. Once again, too, we must commiserate with the many officers whose meteorological logbooks have been assessed 'excellent' but at the same time lack that little something extra which will lift them into the top hundred.

Below is the eleventh successive 'short list' of those ships who sent us the best meteorological logbooks during the year. They are:

1. *Cape Franklin* (Lyle Shipping Co. Ltd.), Captain C. G. Mallett
   *Rakaia* (New Zealand Shipping Co. Ltd.), Captain F. S. Angus
   *Zinnia* (Stag Line Ltd.), Captain W. R. Hunter
2. *Croydon* (South Eastern Gas Board), Captain H. G. N. D'Evelin
   *Glenogle* (Glen Line), Captain W. J. Moore, D.S.C., R.D.
   *Laksa* (Chr. Salvesen & Co. Ltd.), Captain W. G. Ross
   *Pacific Envoy* (Furness Lines), Captain A. H. Cooke
   *Stella Leonis* (Hudson Bros. Trawlers Ltd.), Skipper R. Waller

We congratulate *Cape Franklin* and *Laksa* on their third appearance in an annual short list whilst *Zinnia* now appears for the fourth time. The customary photographs of the three top ships appear opposite page 124; this year it will be noticed that the three ships again give a good indication of the heterogeneous nature of the voluntary observing fleet: an ore carrier, a refrigerated ship on the New Zealand run and a Western Ocean general trader.

The appointment of a full-time Port Meteorological Officer to Hull during the year and the increasing availability of the precision aneroid barometer which takes up very little space in a chart room, have happily enabled us to equip a few trawlers with instruments and bring them in as full observing ships. That two of them have, in their very first year of full observing, earned an Excellent Award proves that these ships, with their habitual bad weather and cramped working conditions, are well able to hold their own in keenness and enthusiasm with their somewhat more lucky brethren whose work lies in kinder waters. A special word of praise must be given to the *Stella Leonis*, Skipper R. Waller, who has gained a place in the above short list.

Awards to trawler skippers and their radio officers who make non-instrumental observations and send radio weather messages for us will continue as before, even though some trawlers have been 'promoted' to the full observing list. This year's awards are also listed on page 109 together with the awards which are being made to the four 'Marid' ships (short sea traders taking sea temperatures only).

During the year 136 of the special forms that we prepared for the use of Auxiliary Ships which might be passing through some of the sparse areas of the world were received here from a large variety of ships and we are particularly grateful to them for helping us to fill in some of the meteorological gaps in the oceans which, since the passing of sail, have been far too many.

The recipients of the awards will, as in past years, be individually notified by letter and asked for an address to which they would like us to send it. Letters sometimes take a long time to reach ships and therefore if any master or officer sees his name in the list in this journal before the official letter reaches him, we would be glad if he would write to us, claiming the award and giving us his forwarding address.

Over the years, we have found that the most popular award is a world atlas and we endeavour to send an atlas to every officer whose name appears in the list for the first time. If, however, any such officer does not want an atlas, we would be glad if he would let us know and we will send him the alternative award.

L. B. P.

# EXCELLENT AWARDS (Year ended 31st March 1965)

| Ship | Captain | Principal Observing Officer | Radio Officer | Owner/Manager |
|---|---|---|---|---|
| *Achilles* | R. G. Boyd | E. Genochio | B. V. Jones | A. Holt & Co. |
| *Afric* | R. T. Welch | P. V. Haswell | H. Barclay | Shaw Savill Line |
| *Aldersgate* | H. H. Howey | H. N. Lawson | J. Rush | Bishopsgate Shipping Co. Ltd. |
| *Apollo* | G. V. Barnes | J. A. Cross | R. M. Roberts* | Bristol S.N. Co. Ltd. |
| *Aramaic* | E. E. Snaith | D. M. Cole | F. Kirk | Shaw Savill Line |
| *Astyanax* | C. S. Mackinnon | R. M. Ireland | H. F. Murray | A. Holt & Co. |
| *Benmacdhui* | W. G. Watson | G. M. McCrone | J. W. Kenny | Ben Line |
| *Brasil Star* | D. McPhail | D. H. Hulme | O. J. O'Shaughnessy | Blue Star Line |
| *Brecon Beacon* | G. A. Austen | H. E. Carlisle | P. J. Boys | Medomsley S.S. Co. Ltd. |
| *British Ambassador* | E. J. Simpson | E. C. Heppenstall | I. J. Newbury | B.P. Tanker Co. Ltd. |
| *Bulimba* | D. C. Murison | W. K. Fullagar | C. J. A. Voutt | British India Line |
| *Byland Abbey* | T. W. Westerdale | F. W. Cooper | A. Stockdale | British Railways Board |
| *Cairndhu* | G. H. Percy | R. Wallace | W. Greaves | Cairn Line |
| *Camellia* | G. W. Mortimer | A. Shaw | B. R. Todd-White | Stag Line Ltd. |
| *Cape Franklin* | C. G. Mallett | G. Anderson | D. McSweeny | Lyle Shipping Co. Ltd. |
| *Cape Howe* | P. Smith | C. McLean | B. Breslin | Lyle Shipping Co. Ltd. |
| *Cardiganshire* | S. E. Allerton | I. A. Russell | C. W. Knibb | Glen Line |
| *Catford* | E. Clarke, M.B.E. | L. Thompson | A. Corkhill | South Eastern Gas Board |
| *Ceramic* | N. S. Milne | I. P. Carr | R. O'Shaughnessy | Shaw Savill Line |
| *City of Swansea* | H. Swinney | H. P. Davies | A. Morris | Ellerman Lines |
| *Clan Macgillivray* | F. H. S. Petherbridge | R. Harden | D. A. P. Galbraith | Clan Line |
| *Corinthic* | H. O. V. Anderson, M.V.O. | A. G. Ewing | H. Polkinghorne | Shaw Savill Line |
| *Cornwall* | W. F. T. Dan | I. S. Roberts | D. Macauley | Federal Line |
| *Cretic* | V. H. Vizer | M. C. L. Wilkie | E. Cathcart | Shaw Savill Line |
| *Crinan* | J. C. Nichol | M. Murray | P. M. Hodgson | J. & J. Denholm Ltd. |
| *Crofter* | H. G. Skelley | H. Traynor | J. A. L. MacDonald | Harrison Line |
| *Croydon* | H. G. N. D'Evelin | B. W. Knill | A. W. Dixon | South Eastern Gas Board |
| *Darro* | R. D. Jones | R. J. L. Greaves | A. E. Chalmers | Royal Mail Lines |
| *Dartwood* | J. Elliott | B. I. Ball | M. Lebbon | Wm. France, Fenwick & Co. Ltd. |
| *Denbighshire* | C. R. B. Goodman, M.B.E. | B. Tang | D. Storar | Glen Line |
| *Deseado* | J. Fox | D. K. Allin | J. Fogarty | Royal Mail Lines |
| *Devon* | I. C. Davison | T. Hughes | K. Dougall | Federal Line |
| *Dorset* | I. Y. Batley | A. P. I. McGuigan | C. J. Metcalfe | Federal Line |
| *Dukesgarth* | P. R. Hansen | D. V. Wood | H. J. Bremner | Wm. Cory & Son Ltd. |
| *Essex* | S. G. Robinson, M.B.E. | A. R. Taylor | A. N. Gibson | Federal Line |
| *Esso Hampshire* | L. J. Smith, D.S.O., R.D. | M. Birchmore | L. Phillips | Esso Petroleum Co. Ltd. |

| | | | | |
|---|---|---|---|---|
| *Explorer* (F.R.S.) | E. A. Bruce, O.B.E. | A. A. Baxter | J. Steven | Dept. of Agriculture & Fisheries for Scotland |
| *Explorer* (m.v.) | A. Sutherland | R. J. Smith | R. Kinney | Harrison Line |
| *Farsistan* | R. Hodgson | A. M. Jenkins | H. A. Buck | Strick Line |
| *Fidra* | J. B. Kerr | C. Begg | A. B. Gibson* | Chr. Salvesen & Co. Ltd. |
| *Fred Everard* | W. G. Hunt | J. P. Skinner | J. London* | F. T. Everard & Sons Ltd. |
| *Glenogle* | W. J. Moore, D.S.C., R.D. | I. W. Bagshaw | D. S. Barber | Glen Line |
| *Glenroy* | I. R. Atkinson | A. M. Kirkland | C. Branthwaite | Glen Line |
| *Gloucester* | J. D. Hellings | C. S. Baugh | W. Davenport | Federal Line |
| *Gloucester City* | D. A. Braid | D. F. Williams | H. Roderick | Bristol City Line |
| *Helenus* | C. T. Collett | D. J. Gallagher | R. J. Hinchcliffe | A. Holt & Co. |
| *Hororata* | J. Weston | A. Allen | S. J. Braithwaite | New Zealand Shipping Co. Ltd. |
| *Ionic* | R. G. E. Grant | E. R. Snow | L. D. Waterhouse | Shaw Savill Line |
| *Jason* | H. S. Clarke, M.B.E., D.S.C. | H. P. Simmons | B. J. Potter | A. Holt & Co. |
| *John Biscoe* | W. Johnston | A. B. Joubert | A. Quinn | British Antarctic Survey |
| *Laksa* | W. G. Ross | J. V. Walgate | P. H. Telfer* | Chr. Salvesen & Co. Ltd. |
| *Laurentia* | T. S. Graham | T. Angus | D. Murray | Donaldson Line |
| *Linkmoor* | F. B. Lamb | R. W. Storey | J. A. O'Hagan | Moor Line |
| *Lismoria* | J. L. Downie | R. Muir | J. Bryce | Donaldson Line |
| *Manchester Faith* | D. G. Thomas | D. J. Howarth | J. J. Walsh | Manchester Liners |
| *Manchester Mariner* | M. E. Bewley | D. Martin | J. Keegan | Manchester Liners |
| *Maron* | A. R. Davidson | I. D. Farrell | E. H. Whitelegg | A. Holt & Co. |
| *Middlesex* | R. E. Baker | P. J. Zealley | R. G. Heath | Federal Line |
| *Milo* | J. F. Tremlett | A. James | E. Foley* | Bristol S.N. Co. Ltd. |
| *New York City* | F. W. Harris | D. G. H. Smith | J. T. W. Moody | Bristol City Line |
| *Nottingham* | G. W. McCathie | R. M. McNair | S. Adams | Federal Line |
| *Oronsay* | R. J. Brittain | L. J. Morrow | J. B. French | P. & O.-Orient Line |
| *Otra* | R. J. Sinclair | J. T. W. Low | T. W. Lawrence* | Chr. Salvesen & Co. Ltd. |
| *Pacific Envoy* | A. H. Cooke | C. E. Nicholls | J. MacG. Shand | Furness Lines |
| *Pacific Northwest* | J. L. Sims | P. E. Hammond | P. J. McKeon | Furness Lines |
| *Papanui* | J. M. Burn | G. B. Johnson | D. C. B. Hepburn | New Zealand Shipping Co. Ltd. |
| *Paparoa* | J. A. North | W. B. Anderson | K. Lamdin | New Zealand Shipping Co. Ltd. |
| *Perseus* | S. C. Llewellyn | P. I. Metcalf | D. Gunnina | A. Holt & Co. |
| *Persic* | G. W. Houchen, O.B.E., R.D. | I. Sayward | W. Peat | Shaw Savill Line |
| *Piako* | D. E. Moran | M. J. Player | K. Anderson | New Zealand Shipping Co. Ltd. |
| *Port Auckland* | C. R. Townshend | A. G. Williamson | H. Horrocks | Port Line |
| *Port Brisbane* | V. G. Battle | R. G. Howell | H. G. Pereira | Port Line |
| *Port Hobart* | J. S. Moate | D. J. Arnold | B. Flinders | Port Line |

* Deck officer.

| Ship | Captain | Principal Observing Officer | Radio Officer | Owner/Manager |
|---|---|---|---|---|
| *Port Lincoln* | V. A. Hunt | J. E. Crowsley | C. Hall | Port Line |
| *Port Macquarie* | I. H. North | J. E. Clarke | J. L. Every | Port Line |
| *Port Nicholson* | E. W. R. Young | J. H. Corse | J. Hands | Port Line |
| *Port Phillip* | J. G. A. Dunn | P. M. P. Muirhead | D. Watson | Port Line |
| *Port Pirie* | H. B. Conby | E. C. Harrison | J. S. McPherson | Port Line |
| *Port Sydney* | L. J. Skailes | J. W. Martin | L. J. O'Sullivan | Port Line |
| *Pretoria Castle* | J. P. Smythe, D.S.C., R.D. | J. N. G. Greaves | G. W. Kilmister, M.B.E. | Union Castle Line |
| *Rakaia* | F. S. Angus | W. J. N. Drummond | J. R. Birkenshaw | New Zealand Shipping Co. Ltd. |
| *Rangitane* | D. H. Chadwick | E. B. Daubeny | L. C. Whittington | New Zealand Shipping Co. Ltd. |
| *Rangitoto* | L. W. Fulcher | M. W. Williams | W. F. Shepherd | New Zealand Shipping Co. Ltd. |
| *Ruahine* | H. N. Lawson, R.D. | P. J. B. Low | C. Lambe | New Zealand Shipping Co. Ltd. |
| *Sagamore* | A. L. Wiles | M. J. Hindmarch | R. A. Wilson | Furness Lines |
| *St. Giles* | G. W. Argumont | R. A. Gill | K. C. Stone | Thos. Hamling & Co. Ltd. |
| *Sidonia* | A. J. F. Colquhoun, M.B.E. | J. Swan | J. F. Gourlay | Anchor Line |
| *Somerset* | A. C. Davies | A. J. Champion | B. Varrall | Federal Line |
| *Southern Cross* | L. J. Hopkins | C. N. Phelan | D. MacRae | Shaw Savill Line |
| *Stella Leonis* | R. Waller | A. Salter‡ | R. R. N. Laing | Hudson Bros. Trawlers Ltd. |
| *Suffolk* | H. J. D. Sladen | A. D. Welsh | R. Irwin | Federal Line |
| *Trefusis* | G. Joslin | M. J. Ball | I. Farren | Hain S.S. Co. Ltd. |
| *Tremorvah* | H. Gravell | R. G. Whisker | P. G. Prestige | Hain S.S. Co. Ltd. |
| *Trewidden* | E. D. Stewart | I. Smith | R. A. H. Clarke | Hain S.S. Co. Ltd. |
| *Truro* | J. K. Marrow, M.B.E. | J. M. Jarratt | N. S. Collett | Ellerman's Wilson Line |
| *Turakina* | D. B. Brittain | M. J. Perfect | W. B. Aitchison | New Zealand Shipping Co. Ltd. |
| *Welsh City* | D. Beynon | R. M. Gidden | G. Thomas | Sir Wm. Reardon Smith & Sons |
| *Western Prince* | J. R. Steven | M. I. Bower | I. Strachen | Prince Line |
| *Yorkshire* | A. E. Young | W. A. Raillon | P. Jones | Bibby Line |
| *Zinnia* | W. R. Hunter | S. D. Hyland | J. J. O'Sullivan | Stag Line Ltd. |
| **'MARID' SHIPS†** | | | | |
| *Cheshire Coast* | C. A. Hopkins | T. Sheehan | J. M. Jealey* | Coast Lines Ltd. |
| *Duke of Rothesay* | J. B. Williams | L. Edwards | A. Atkinson | British Railways Board |
| *Helmsdale* | A. F. Ross | J. Masson | — | Northern Trading Co. Ltd. |
| *Warwickbrook* | D. J. Moyes | N. Simpson | W. H. Alexander* | Williamstown Shipping Co. Ltd. |

* Deck officer.

‡ Relief skipper.

† Vessels in the short sea trades recruited for the purpose of observing and transmitting sea temperatures.

## TRAWLERS

| Skipper | Wireless Operator | Ship | Owner |
|---|---|---|---|
| B. A. Ashcroft .. | A. J. Nettleship | *Benvolio* | Hellyer Bros. Ltd. |
| W. Fry .. .. | C. Knaggs | *Kingston Jade* | Kingston Steam Trawling Co. Ltd. |
| W. March .. .. | — | *Portia, Falstaff* | Hellyer Bros. Ltd. |
| J. A. Kersey .. .. | — | *Stella Aquila* | Hudson Bros. Trawlers Ltd. |
| — | E. D'Constantine | *Stella Aquila* | Hudson Bros. Trawlers Ltd. |
| — | R. T. Murphy | *Portia, Stella Procyon, Kingston Garnet* | — |
| A. Osler.. .. .. | — | *Kingston Garnet* | Kingston Steam Trawling Co. Ltd. |

# July, August, September

*The Marine Observers' Log* is a quarterly selection of observations of interest and value. The observations are derived from the logbooks of marine observers and from individual manuscripts. Responsibility for each observation rests with the contributor.

It sometimes happens that we are unable to offer an explanation for phenomena reported. In such cases we shall be very glad to hear from any reader who can put forward an authoritative or a possible explanation, which could be published in this journal. We should also be glad to hear from any reader who has witnessed a similar phenomenon in the past, but which has not previously been communicated to us.

## WINTER STORMS

### South Australian waters

m.v. *Bulimba*. Captain D. C. Murison. Adelaide to Fremantle. Observers, all officers.

11th–16th July 1964. *Bulimba*'s passage from Adelaide to Fremantle between 11th and 16th July may be of interest as being typical of the stormy conditions which had prevailed over the whole of the southern half of Australia for several weeks. Weather experienced was not phenomenal by, say, North Atlantic standards but many centres reported record wind gusts, and the persistence of steep gradients and low pressures was remarkable. A few incidents deserve special comment:

(i) The line squall experienced at 1236 GMT on 12th July and reported as exceeding 55 kt is believed to have been fully force 12. Officers woke in alarm as the entire accommodation block shook and resounded to the blast and the Captain, who was on the bridge, said that it was the strongest wind he had ever experienced (see photograph opposite page 133). It was presumably this squall that Adelaide recorded a few hours later at over 70 kt, and stated to be the strongest gust on record there. Shortly afterwards Melbourne recorded a squall of 80 kt.

(ii) The steep fall of pressure on 14th July seems phenomenal for temperate latitudes. Taking advantage of a temporary lull in the head winds, the ship was

Positions of ships whose reports appear in "The Marine Observers' Log".

making over 13 kt and presumably ship and storm centre were approaching each other at a combined speed of 30–40 kt at right angles to the isobars.

(iii) During 15th July several more squalls were experienced which are believed to have approached force 12. The ship suffered damage to bulwark plating and deck fittings, but in the circumstances fared surprisingly well. Seas encountered off Eclipse Island on 15th July were not as large as might have been expected with such fierce winds, partly because the coast offered a partial lee at the height of the gale, and partly perhaps because the wind blew steadily in excess of force 9 for only eight hours or so. Nevertheless an attempt to close the coast off White Topped Rocks had to be abandoned as seas rose dangerously when the bottom shoaled to less than 70 fathoms.

A temporary lull enabled the ship to round Cape Leeuwin and to enter Fremantle at 1000 on the 16th. The waters of Fremantle harbour are normally still and clear but on this occasion a strong current was running seaward and the water was chocolate brown from recent rains inland. Within hours of the ship's berthing, the NW'ly wind had risen to gale force once more and by the evening of the 17th the combined effect of wind, current and heavy ground swell was so great that the mooring lines (totalling twelve parts of rope or wire at each end) began to chafe and part one after another, and some difficulty was experienced in keeping the ship moored. A line squall with thunder and lightning struck the port at 2040 GMT on the 17th, the wind backing WSW with a gust recorded by Perth Weather Bureau as 73 kt. Thereafter pressure began to rise steadily and the wind slowly moderated, although squalls of force 10 occurred frequently until 0400 GMT on the 18th.

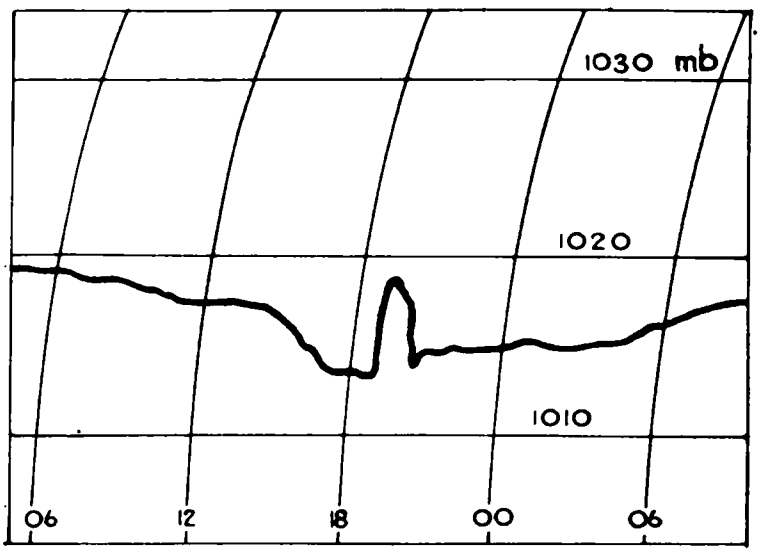
## SUDDEN SQUALL

### at Antwerp

s.s. *Loch Gowan*. Captain R. D. Jones. Observer, Mr. A. J. Love, 4th Officer.

18th July 1964. During the evening, from about 1840 to 1920 CET (1740 to 1820 GMT) while the vessel was berthed at Antwerp, a heavy squall was experienced. The wind increased from a light W'ly air to WSW force 10 in 2 or 3 min and shortly

afterwards rain fell heavily. After about 15 min the wind eased to force 6 or 7. During the squall the sky was very heavily overcast and although the sun had not yet set, the ship's floodlights had to be switched on. The surface of the River Schelde was very choppy and visibility was seriously affected by rain and darkness. By 2000 (1900 GMT) the wind had become NW'ly force 1–2. The sudden large changes in pressure during the storm are clearly seen in the accompanying reproduction of the barograph trace.




Position of ship: berth 29A at Antwerp.

*Note.* The synoptic weather charts produced by the Meteorological Office showing the general situation at hourly intervals, indicate that thunderstorms were very widespread during the afternoon and evening especially over SE England, NE France, and the Netherlands. A large, shallow complex area of low pressure, with several centres, one to the NE of Antwerp, covered England and the near Continent. In such a weather situation, thunderstorms, sometimes with heavy squalls, are quite commonly experienced.

## LOW CLOUD BASE

### off South Irish coast

s.s. *Pacific Envoy*. Captain A. Cooke. Glasgow to Panama. Observer, Mr. C. Nicholls, 3rd Officer.

17th July 1964. At 2100 GMT when off the Tuskar Rock there was dense fog, which later became patchy. It lifted to 150 ft becoming a sheet of low cloud by 2230. The sea was calm and shoals of fish could easily be seen in the light of the Aldis lamp which was trained on the surface; the reflection of the light from the sea could clearly be seen upon the cloud base which was at mast height. Although there had recently been fog and the cloud was so low, the lights of other vessels could be seen 14 miles away.

Position of ship at 2359: 51° 42'N, 7° 06'W.

*Note.* The good visibility found under the low stratus was due to slight turbulence of the air near the surface. The moist air was apparently very local and patchy and the mixing, by turbulence, of this air with the relatively dry air in the vicinity lifted the fog and mist particles from the surface causing the visibility to become good.

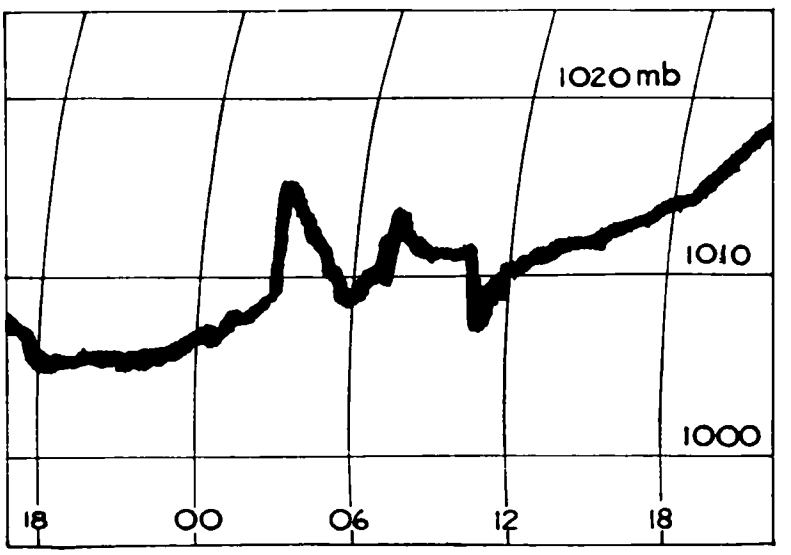
## LARGE ERRATIC PRESSURE CHANGES

### approaches to River Plate

m.v. *Darro*. Captain C. C. Dingle. Buenos Aires to Lisbon. Observers, the Master, Mr. R. G. Dabinett, 2nd Officer and Mr. R. J. L. Greaves, 3rd Officer.

28th–29th August 1964. Having cleared a fog patch at 2330 GMT, visibility began to decrease again an hour later and speed had to be reduced at 0250 GMT. At 0300

rain was observed on the radar, approaching from the stern: the ship was in moderate fog and sheet lightning was seen. The wind was on the port bow at this time, but at 0330 it backed to south, the fog cleared and heavy rain began accompanied by forked lightning and loud thunder. There was very marked phosphorescence in the




breaking waves. At about this time the barograph rose vertically by 6·5 mb (see trace reproduced above); it then fell at a rapid rate for the next 2½ hours. The following observations were also made:

0030: Wind NE'E force 5. Air temp. 57°. Wet bulb 57°.
0500: Wind SE'S force 3. Air temp. 55°. Wet bulb 55°.
Rain ceased but lightning continued.
0530: Wind SE force 4. Rain and lightning.
0630: Wind SE force 5. Continuous rain and lightning.
Position of ship at 0200: 34° 52'S, 54° 17'W.

*Note.* Reference to the synoptic weather maps issued by the National Meteorological Service of the Argentine shows that on the night of 28th–29th August 1964, a cold front closely followed by a trough of low pressure, both orientated NNW–SSE, crossed the estuary of the River Plate; the direction of movement was from SW–NE approx. The clearance of the fog, the onset of the heavy rain with thunder and lightning and the wind change, occurred when the cold front and trough passed over the vessel. The large erratic changes of pressure were typical of the weather situation and are associated with the violent ascending and descending air currents found in thunderstorms. When the air is ascending pressure falls, while descending air causes pressure to rise.

## EXTENSIVE FOG

### English Channel, French, Spanish and Portuguese waters

s.s. *Southern Cross*. Captain L. J. Hopkins. Southampton to Las Palmas.

8th–10th September 1964. Soon after leaving Southampton we ran into fog which persisted throughout the passage of the English Channel and down past Ushant, until we were well into the Bay of Biscay. A clear period was then experienced until beyond Finisterre when we ran into another extensive area of fog. This continued until we were about 80 miles W of Lisbon on the evening of the 10th when the fog finally dispersed.

*Note.* The fog experienced from the 8th to 10th September was due to the presence of an extensive area of rather warm moist air of subtropical origin. The air, travelling mainly NE'wards towards high latitudes, became gradually cooler as it moved over the sea, the temperature of which was progressively falling. Fog formed when the sea cooled the air down to the dew-point. The patchy distribution of the fog may be explained by the fact that the air was not entirely homogeneous and that only in places had it cooled to its dew-point.

## FOG

### Spanish waters

m.v. *Astyanax*. Captain C. S. MacKinnon. Port Said to Liverpool. Observers, Mr. M. P. Stone, Chief Officer and Mr. P. M. Watt, Extra 3rd Officer.

2nd September 1964. When west of Vigo, at 0615–0700 GMT, the ship passed through 'waves' of thick fog, approx. 70 ft high and 100 ft in width, lying in an E–W direction. The bridge was above the 'troughs' and this gave the effect of the fog appearing to roll down on to the ship. Similar bands of fog were seen about 5 miles to the west extending in N–S lines: the height was approx. 100 ft but the width of the bands could not be estimated. Thick fog, seen as an undulating mass, was observed over the Spanish coast. Later at 0700, the ship ran into moderate fog which was continuous. Air temp. 63·8°F, wet bulb 63.8°, sea 64·4°. Wind calm.

Position of ship at 0600: 42° 12′N, 9° 42′W.

*Note.* The weather charts show that skies were clear during the night over the Finistere area. It seems probable that the fog through which the vessel passed formed overland as the result of radiation and was drifted out to sea by the very light winds. The wave-like appearance of the fog suggests that there was a corresponding wave motion of the air, which was probably in a critical state as regards condensation. As the air descended it warmed dynamically and dried: as it ascended it cooled dynamically and the water vapour in it condensed.

## EXCEPTIONAL VISIBILITY

### off Lüderitz Bay, S.W. Africa

s.s. *Clan Mactavish*. Captain C. A. Thomas. Beira to Walvis Bay.

10th July 1964. Conditions of exceptional visibility were experienced off Lüderitz Bay between 0200 and 0400 GMT. Diaz Point Light, whose extreme range for our height of eye (43 ft) is 21 miles, was observed at 0154 at a distance of 46½ miles. It remained visible until 0400 when it was 50 miles away. The distances were calculated by running back the ship's course and speed from stellar observations obtained at 0515. Air temp. 59·8°F, wet bulb 55·6°, dew-point 52°, sea 59·1°. Sky cloudless. Wind, WSW force 3.

Position of ship at 0000: 27° 36′S, 14° 48′E.

*Note.* Exceptional visibility of this type may sometimes occur when the sea is colder than the air and the dew-point is below the temperature of the sea. In such conditions the rays of light from a distant object below the horizon are bent in such a way that they follow the earth's curvature, thus rendering the object visible, when it could not otherwise be seen.

## DISTURBED WATER

### Arabian Sea

m.v. *Border Pele*. Captain E. L. Lloyd. Walvis Bay to Bahrein.

5th September 1964. The vessel, whilst steering a course of 033°, speed 16 kt, was experiencing fresh to strong SW'W monsoon winds with a rough confused following sea and an apparent cross sea coming from the starboard beam, when at about 0815 GMT what appeared as a heavy line of continuous breakers was seen ahead. This disturbance was the more unusual in that it showed up so well in the rough conditions prevailing.

When the vessel met the line of disturbance at 0830 GMT, it was seen to be running from horizon to horizon in a straight line 140°–320°. The vessel was under automatic steering and at the moment of meeting the disturbance, the ship's head swung quickly to 025° then returned just as soon to the course 033° with no further aberration of steering.

The following sea temperatures were observed before, during and after crossing the disturbance: 0500—77°F; 0830—70°; 0900—70°; 1300—78°. For the previous 24 hours the vessel had experienced a current of 2 kt setting 034° and for the following 24 hours a current of 1 kt setting 080°. The sea appeared to be smoother after crossing the disturbance.

I am aware that this area east of Socotra is well known for its confused seas in the SW monsoon, but the above disturbance was so spectacular as to be worth recording.

Position of ship: 9° 59′N, 53° 55′E.

*Note.* This observation was forwarded to Dr. L. H. N. Cooper of the Marine Biological Association at Plymouth who in turn passed it to Dr. J. C. Swallow who was working in the area at the time as one of the scientists in R.R.S. *Discovery.** Dr. Swallow comments:

"The report of disturbed water from the *Border Pele* is of great value to me in confirming an observation made by the research ships *Discovery* and *Argo* in the Somali current during August and early September 1964.

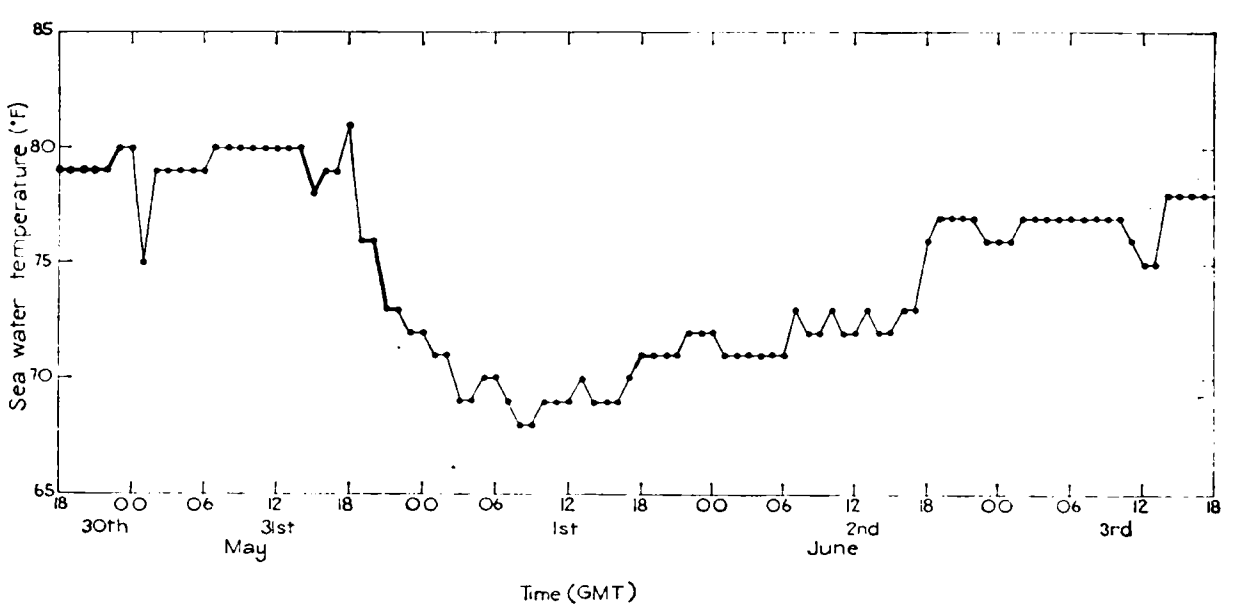
"We noticed that, after the Somali current had left the coast at about 9½°N, turning E and then SE, with cold water upwelling on the left-hand side, the cold water seemed to be drawn out along the current in a narrow streak reaching at least as far as 55°E. There was a countercurrent running NW in the warm water on the northern side of the streak. It seems most likely that the *Border Pele* observed the same phenomenon. The only time we crossed this ribbon of cold water in the *Discovery* was at night and I am very grateful to Captain Lloyd for his vivid account of its appearance. The occurrences of rough and smoother water, and the deflection of the ship's head which he describes, are consistent with the presence of a SE'ward current (an extension of the Somali current) on the southern side and a countercurrent on the N side of the line of disturbed water."

## SEA TEMPERATURE AND CURRENT OBSERVATIONS

### Eastern Pacific Ocean

m.v. *Rakaia.* Captain F. S. Angus. Balboa to Wellington. Observers, the Master and all Observing Officers.

30th May–3rd June 1964. The sea temperature readings (by insulated bucket) shown in the accompanying graph were taken hourly throughout the period. Details




of current rips or lines which were observed are given in the table. The directions of the current rips compare favourably with the sets of the currents calculated between observed positions.

* See the article by Dr. J. C. Swallow on page 125 of this number of *The Marine Observer.*

| Date | Times of Observation (GMT) | Mean Latitude | Mean Longitude | Direction of Rip | Sea Temperature (°F) |
|---|---|---|---|---|---|
| 30.5.64 | 1830–2300 | 5° 57′N | 81° 43′W | 120°/300° | 79 |
| 31.5.64 | 1400–1600 | 2° 30′N | 85° 17′W | 160°/340° | 79 |
| 31.5.64 | 1830–2000 | 1° 53′N | 86° 06′W | 100°/280° | 76 |
| 31.5.64 | 2045–2145 | 1° 37′N | 86° 28′W | 110°/290° | 73 |
| 1.6.64 | 1730–1830 | 1° 23′S | 91° 03′W | 090°/270° | 71 |

## FALL OF SEA TEMPERATURE
### off Cape Guardafui

m.v. *Crystal Jewel.* Captain D. Patrickson. Suez to Colombo. Observers, the Master and Mr. M. J. M. Tyrrell, 2nd Officer.

13th September 1964. At 0930 SMT when the vessel was 20 miles from Cape Guardafui, which bore 135°, the sea temperature was 83°F. Another reading was taken at 1100, the Cape then being 13 miles distant on a bearing of 200°, when it was found that the sea temperature had dropped to 69°—a change of 14°. During the following hour the sea temperature fell a further degree, but after this it began to rise again slowly, reaching 73° by 2000.

Position of ship at 0930: 12° 06′N, 51° 00′E.

*Note.* The variations of sea temperature in the vicinity of Cape Guardafui are well recognised. There is a marked increase in temperature with increasing distance w'wards through the Gulf of Aden. E'wards, towards Socotra, the temperature decreases, the average sea temperatures falling to 76° in September. The reading of 69°F reported represents what is just about the minimum sea temperature for the area in September.

## ICEBERG CAPSIZES
### approach to Belle Isle

s.s. *Laurentia.* Captain T. S. Graham. Glasgow to Montreal. Observers, the Master, Mr. A. McGugan, Chief Officer and Mr. D. Kerr, Apprentice.

6th August 1964. At 0850 GMT the vessel passed within one mile of an iceberg which was observed to be rolling slowly over, completing a full revolution in approx. 1½ min. This was seen to occur four times as the ship passed. The berg was turning over into the wind which was NE, force 8. A low, dying swell was present, moving from E'S. Air temp. 44·5°F, sea 40°.

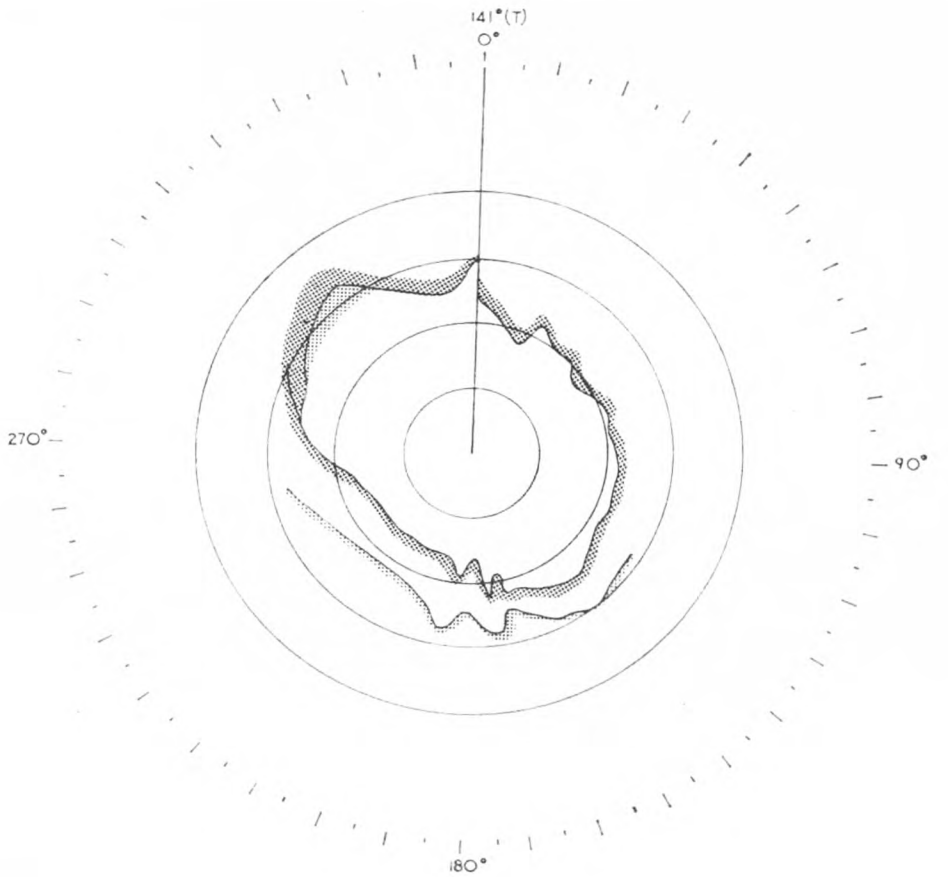
Position of ship: 52° 03′N, 55° 00′W.

## RADAR ECHO
### Red Sea

m.v. *Sussex.* Captain J. R. Ramsay. Port Sudan to Aden. Observers, Mr. M. Parry, Chief Officer and Mr. R. Longworth, Junior 3rd Officer.

22nd June 1964. An unusual radar echo was observed, in the form of an irregular ring around the vessel. At first this was thought to be second trace return, but subsequent observations of the echo seemed to disprove this and our opinion is that it marked the limits of the dust cloud under which we were proceeding. At this time the sun was shining through the cloud and had a slightly bluish tinge. The sketch shows the PPI picture and is made up of plots taken every 10′ or so of arc in a clockwise direction, between 1413 and 1417 GMT. An interesting feature is the distinct double echo 3 miles outside the original one, astern and on both quarters.

The ring subsequently extended outwards—principally in a s'ly direction—becoming fainter as the distance increased. At the same time the sky overhead




cleared quite considerably, revealing $\frac{3}{8}$ $C_H2$. The echo finally disappeared at a range of 25–30 miles.

Similar phenomena were observed by the 3rd Officer in the Mediterranean, and by the 2nd Officer, again in the Red Sea. In the first case it took the form of an irregular line which was picked up at a range of about 6 miles ahead of the ship and on the course line, and which faded out at about the same distance astern. It was made up of individual echoes rather than echoes fused together such as rain clouds produce. The sky in this instance appeared to be clear and it was thought the echoes were numerous fishing markers, but this proved to be incorrect.

In the second case it took the form of an irregular line, at first astern of the ship, extending across the course line. The echo gradually spread out and around the vessel until eventually it completely encircled it. It spread outwards the whole time and finally disappeared at extreme range. Type of radar: Marconi Radiolocator IV, range 40 miles. During observations the radar was in normal operation working well, ships being picked up at extreme range. Air temp. 91°F, sea 86°. Wind NW'N, force 4. Sky overcast with dust cloud.

Position of ship: 18° 24'N, 39° 03'E.

*Note.* Captain F. J. Wylie, Director of the Radio Advisory Service, comments:

"This report with its supporting sketch suggests that the cause of the phenomena was most probably 'atmospheric discontinuities'.*

"Sharp changes in the lapse rate or rate of change of temperature or humidity a few hundred feet above sea level may give rise to echoes of an indefinite character, rather like second trace echoes of land, but extending over several miles and occasionally annular in form. These echoes have been observed when there has been no possibility of multiple trace echoes of land nor echoes from rain or cloud.

"The 'double' effect was most probably due to the height of the discontinuity above the surface, which in certain conditions would result in a direct echo as well as one reflected from the sea surface."

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* London, Meteorological Office. Radar and meteorological conditions. Atmospheric discontinuities. *Mar. Obs., London*, **33**, 1963, p. 214.

## EXCEPTIONAL RADAR ECHOES

### off Minicoy Island

m.v. *City of Swansea.* Captain I. McBeath. Cochin to Aden. Observer, Mr. A. M. Woodroffe, 3rd Officer.

28th July 1964. At 1630 GMT the vessel was off Minicoy Island, and a very good radar echo was received at 26 miles, bearing 196°.

The 'Pilot' states the maximum range for a good echo is 18 miles and for a moderate one, 21 miles. The echo was extremely clear and rain clouds over the island were seen plainly on the screen. They moved away in an ESE'ly direction leaving only the 'hard' echo of the island. As the bearing decreased and the vessel came closer to the island, the target echo became poorer until when on the beam, bearing 159° at 20¼ miles, the echo became very faint indeed, and vanished completely when the island was just abaft the beam. Air temp. 81·0°F, wet bulb 77°, sea 81·5°. Pressure (corrected): 1007·1 mb. Wind WNW, force 3. Heavily overcast with frequent rain showers.

Position of Minicoy Island: 8° 16′N, 73° 1′E.

*Note.* Captain F. J. Wylie, Director of the Radio Advisory Service, comments:

"Reference to the current table of reported radar detection ranges in Supplement No. 2—1963 to the *West Coast of India Pilot*—page 23 shows Minicoy Island to be 'Poor' at 19 miles, 'Good' at 17 miles and 'Identifiable' at 15 miles.

"These ranges are based on the averages of the individual reports from 29, 42 and 10 ships respectively.

"Whilst the view of the island shown on page 347 of the pertinent 'Pilot' suggests this to be a poor radar target, evidence from sea lends support to the fact that in this area some slight super-refraction exists at most periods of the year.

"The fact that the *City of Swansea* reports the very good echo of the island at 26 miles clearly indicates the presence of enhanced super-refraction or possibly ducting on this bearing which later gave way to more normal propagation conditions as the ship moved into the windward area of the island from which general direction the precipitation was moving."

## RADAR PERFORMANCE

### Ligurian Sea

m.v. *Cape Franklin.* Captain C. Jones. Savona to Bône. Observer, Mr. G. A. Mackay, 2nd Officer.

18th September 1964, at 0215 GMT. On sighting the looms of both Cap Corse and Revellata Point lights on the NW corner of Corsica, the radar was switched on to check the ship's position. The coast of Corsica appeared on the screen at approx. 35 miles which checked with the DR position. However the coast of Italy to the NW'ward appeared equally as strong on the screen at a distance of 17 miles when the ship was actually 55 miles from that coast. The lights already mentioned were at distances of 44 and 32 miles respectively and both are 23-mile lights. The Italian coast remained on the screen until about 0235 and did not appear again. Previous to this observation there was a very thin layer of altostratus covering the sky but at 0215 the sky was clearing to ⅛th cover. Wind W'ly force 4. Air temp. 70·3°F. Sea 73°. Radar Decca type No. 669.

Position of ship: 43° 06′N, 8° 24′E.

*Note.* Captain F. J. Wylie, Director of the Radio Advisory Service, comments:

"There was evidently very strong super-refraction on the night in question on both light waves and radio waves. The echoes reported at 17 miles when the ship was 55 miles from the coast of Italy were probably second trace echoes of mountains lying about 43 miles behind the coastline. As the PRF of the radar is in the neighbourhood of 1000 c/s, the nearest second trace echo occurs at 81 miles and the echoes seen were, therefore, at a range of about 98 miles."

## CETACEA
### Western North Atlantic

s.s. *Maidan*. Captain D. A. Keller.

20th August 1964 at 2120 GMT. "In thirty years at sea, I have repeatedly seen and watched the antics of porpoises, but until this evening I have never before witnessed them doing anything other than what appears to be playing. Today though, things were different and I record the following for your information and interest. I sighted the school on my starboard bow about two miles away and although many were seen to be jumping, the most striking aspect of the scene were the dozens of dorsal fins sticking out of the water with their owners completely motionless. As we drew nearer it was observed that the visible and stationary dorsals belonged to about 50 or 60 porpoises lying half awash. The whole group was formed into a perfect semi-circle with the open side facing the NW. They were spaced no more than 2–3 ft apart, were keeping their positions like soldiers on parade and all appeared to be working their upper jaws as if eating. Across the open side of the semi-circle to the NW were another 50 or more leaping and jumping in the usual manner, but although the ship passed only a quarter of a mile away, the formation held and only two of the 'outer guard' left the school and gambolled alongside us and even they quickly left and returned to their companions. As a ship normally passing so close to a shoal usually acts like a magnet in drawing them alongside, this disregard was quite remarkable. They were observed in the same positions until lost sight of some 20 min later. Presumably they were feeding, but there were no signs of fish life and hadn't been all the afternoon.

"Weather at the time was light variable winds, slightly more than a rippled sea, very low S'ly swell and heavily overcast. Air and sea temps. at the time were 73°F although the latter had been varying alarmingly between 60° and 80° all day. Perfectly smooth oily patches of sea were observed all round and large amounts of gulf weed in small bunches had been seen all day. Sea birds visible at the time were Wilson's Petrels, Leach's Petrels and Cory's Shearwaters."

Position of ship: 41° 26′N, 54° 38′W.

*Note.* Dr. F. C. Fraser, Keeper of Zoology at the Natural History Museum, was very interested in this observation and sent a copy of the Museum's publication *Stranded Whales* to enable Captain Keller to give further details.

Captain Keller then wrote:

"After due thought and examination of the illustrations in the booklet, I would say that the beasts forming the motionless semi-circle were almost certainly Blackfish. Their sizes were definitely very much more than the 5–6 ft of ordinary porpoises and could well have been 20 ft or slightly more. Indeed, had I not seen some of the 'out riders' jumping, I might well have taken them for basking sharks, as their obvious great length plus the marked concavity of their dorsals, had immediately registered that thought in my mind. Their heads were definitely bulbous, as my attention was particularly drawn to them by the steady 'munching' motion of their jaws; but as only the upper portion was visible from an end-on direction, I would not stress this, although I feel positive about it. Pigmentation was almost certainly pure black. As regards the jumping out of the water—it now becomes apparent that I wasn't observing as closely as I might but after reading Dr. Fraser's remarks, the memory picture is that those beasts which were doing the jumping were most definitely not as long as the ones forming the semi-circle."

Dr. Fraser then commented:

"It is clear from Captain Keller's second letter that two different kinds of cetacean were involved, the bigger ones "2–3 ft apart" forming the semi-circle and the smaller ones closing the semi-circle behaving as small dolphins are known to do. The bigger ones seem pretty certainly to have been Blackfish; the smaller ones are not identified. It is interesting to have Captain Keller's information of what appears to have been an interspecific co-operation in feeding. Association between different kinds of cetacean is known to happen, for

instance the little cruciger dolphin with the fin whale, and the southern right whale dolphin with another having no common name—*Lagenorhynchus obscurus*. I am sure there are others but these come to mind."

(Dr. Fraser mentions that the upper jaw does not work independently of the rest of the head, so that it must have been either the head that was seen to move or the lower jaw.)

## RESCUE FROM SHARKS

### Western North Atlantic

s.s. *Maidan*. Captain D. A. Keller. Malta to Philadelphia. Reported by Mr. J. I. Clucas, 2nd Officer.

23rd July 1964. "We were fortunate in being able to pick up all four survivors of the yacht *Gooney Bird* who had been adrift in a small inflatable yellow rubber life-raft for 9 days. The rescue was effected in 37° 04'N, 66° 57'W which is on the southern fringes of the Gulf Stream. On approaching to within about 50 yd of the raft, five sharks about 12 to 15 ft long could be seen swimming round but far more spectacular were the other large fish present. They were between 3 and 5 ft long and very brilliantly coloured, with kingfisher blue, emerald green and yellow. Two species were identified with the aid of an American paper-back published by the Golden Press of New York entitled: *Fishes, a Guide to Familiar American Species No.* 278. They were, from page 85, the king mackerel and from page 87, the yellowfin tuna.

The survivors themselves commented that at the beginning of their ordeal they hung a canvas bag containing their canned food over the side to keep it cool and to give themselves more room, but during the night a fish took it all including the canvas. They maintained that it was a shark but as none of them saw it they were unable to say definitely. Almost as soon as they had taken to the life-raft numerous small fish gathered around, but sometime later larger fish came on the scene eating and frightening away the smaller ones. This process was repeated time and time again until at the end of 9 days there were just the sharks and large fish previously described remaining. They were also caused a great deal of discomfort by fish using the flexible bottom of the life-raft as a back scratcher, in fact, sometimes they would swim underneath pressing so hard on the rubber bottom that on reaching the other side they would shoot two or three feet into the air."

*Note.* Mr. F. C. B. Lee, Secretary of the Naval Lifesaving Committee, comments:

"It is well known that fish are attracted by a strange object, that they seek the protective shade of a raft and that small fish attract large fish. The similarity of this incident with the experiences of Dr. Alain Bombard, during his crossing of the North Atlantic, is very striking. Bombard trailed a piece of fabric and it was taken at night by a creature which he did not see. He was accompanied by large fish (Dorado) for a very long time, and his rubber boat was buffeted by various creatures without damage to the craft. What is different is that Bombard's sharks were aggressive, and when they appeared the dorado temporarily withdrew. It is probable that had the *Gooney Bird* survivors been adrift for a longer period their sharks would have become more troublesome, and the other fish would have withdrawn.

"As for the survivors, survival for 9 days without food is well within the bounds of possibility, but it is only just possible without drinking water."

## WHALES

### West African waters

m.v. *Aldersgate*. Captain H. H. Howey. Monrovia to Cardiff. Observer, Mr. J. M. Vening, 3rd Officer.

23rd July 1964. At 1050 GMT, four whales were seen floating side by side and in contact with each other, all facing the same direction. They were practically motionless on the surface of the sea and seemed unperturbed by the movement of

the ship which passed them at a distance of about 3 cables. Another somewhat odd feature was that each was 'blowing' almost simultaneously with the others. All the whales had a small, semi-circular dorsal fin.

Position of ship at noon: 19° 06'N, 17° 12'W.

### east of the Galapagos Islands

m.v. *Rakaia*. Captain F. S. Angus. Balboa to Wellington. Observers, Mr. N. Drummond, 3rd Officer, Mr. A. Anderson and N. Miller, Apprentices.

31st May 1964. Two whales estimated at 15 ft in length were seen close to the vessel. They appeared to be fighting and there was blood on the water.

Position of ship: 1° 47'N, 86° 15'W.

## JELLY-FISH

### Red Sea

m.v. *Rosetti*. Captain D. G. Martin. Suez to Aden. Observer, Mr. D. H. Wells, Chief Officer.

12th September 1964. At 1315 GMT a shoal of jelly-fish was observed lying in a direction 150°–330°, parallel to the ship's course (149°). It was about 2½ miles long but only about 6 ft wide: occasionally there were gaps in the shoal about 50 ft wide. The fish were about 3 in in diameter with broad heads and grey tendrils.

Is there any reason for their being together in one mass like this? Sea temp. 82°F. Wind NW'ly, force 4–5.

Position of ship: 26° 34'N, 34° 38'E.

*Note.* Dr. W. J. Rees of the Department of Zoology, British Museum, comments:

"Shoals of jelly-fish drifting at the will of the tide and the wind are often congregated into shoals or long, drawn out bands under certain tidal and meteorological conditions. Most jelly-fish have small fish accompanying them either for shelter from larger predators or because they prey on the jelly-fish or their commensal crustaceans.

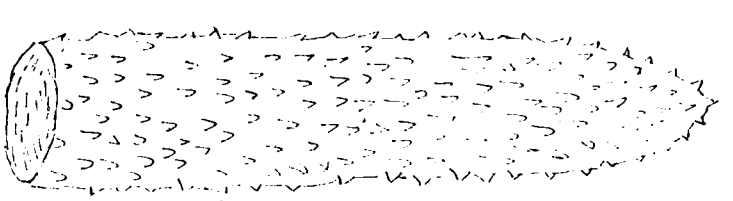
## PHOSPHORESCENCE

### South Atlantic Ocean

m.v. *Sagamore*. Captain A. L. Wiles. Victoria to Birkenhead. Observers, the Master, Mr. J. G. Usher, 2nd Officer and Mr. M. J. Hindmarch, 3rd Officer.

30th September 1964. Between 1600 and 2000 GMT a few flashes of light, rather like exploding flash-light bulbs, had been seen on, and below, the surface: at 2100, a few bright patches were visible in the dull phosphorescence of the ship's wash. When the Aldis lamp was shone on the surface, a sort of 'cats' eyes' effect was seen in places, while elsewhere numerous translucent bodies were seen. The number of phosphorescent particles increased until definite bands of light began to appear at right angles to the ship's head. They were about 10 ft wide and spaced at intervals which varied from 400 to 1,000 ft. They extended in both directions as far as the eye could see.

At 2212 the vessel was stopped for half an hour for repairs and when the propeller ceased turning, the wake became a very bright green. A bucket put on the side for a sample was found to contain pieces of organic matter about 6 in long and ½ in in diameter, shaped rather like a finger stall (see sketch). The centre was hollow



and the outside was covered with short blunt spines. In texture and colour the

objects resembled polythene, being colourless and lacking the usual veining associated with jelly-fish. They exhibited no movement. Although not rigid, they kept their shape when handled rather as if they were made of plastic. When left quietly in the bucket they were transparent, but they glowed very brightly when the water was agitated. Sea temp. 80°F. Wind E'S, force 4.

Position of ship: 3° 04'S, 31° 55'W.

*Note.* Dr. R. H. Kay of the University Laboratory of Physiology, Oxford, writes:

"This animal is almost certainly one of the tunicates and possibly is *Pyrosoma*, an example of a very brightly emitting marine bioluminescent creature. It is peculiar in being strictly not one animal but a collection of smaller individuals, 'zooids', in association. Nicol has reported that these colonial animals glow only when excited by external stimuli, chemical, electrical, optical, or as observed in m.v. *Sagamore*, mechanical. Once one or a few zooids are excited into luminescence they appear to be able to stimulate adjacent ones so that the light spreads along the colonial animal like a wave."

## Gulf of Aden

m.v. *Rakaia*. Captain F. S. Angus. Auckland to Aden. Observers, Mr. N. Drummond, 3rd Officer and Mr. P. Starkey, Apprentice.

7th September 1964. Occasional flashes of light were noticed on the sea at 2200 GMT, but when an Aldis lamp was played on the water, hundreds of small bright lights appeared. The majority were a red colour, but there were a few which were green or white. The organisms responsible appeared to be very animated and moved jerkily in all directions. The radar which was in operation for some time had no affect upon the phosphorescence. Sea temp. at 2100, 81°F. Wind SSE, force 2.

Position of ship: 12° 10'N, 50° 18'E.

## off Muscat Coast

s.s. *Zaphon*. Captain G. A. C. Nelson. Persian Gulf to Milazzo (Sicily). Observer, Mr. J. Browning, 3rd Officer.

9th July 1964. At 1800 GMT the vessel was proceeding through heavy weather, with waves breaking over the forecastle head causing much spray and many phosphorescent patches on the fore deck. These were mainly greenish in colour and continued glowing for only a sec or two. Two small particles however landed on the bridge windows and one of them remained glowing for 5 min and the other for more than 45 min. In both cases they emitted a greenish light. On inspection with a torch, the long-glowing particle was apparently a small blob of brownish jelly: the point of emission of the light seemed to be much smaller than the particle of jelly itself. Sea temp. 75·5°F.

Position of ship: 18° 12'N, 57° 24'E.

## South Indian waters

s.s. *Serenia*. Captain C. A. Waters, O.B.E. Mina-al-Ahmadi to Port Dickson. Observer, Mr. B. G. Calderwood, 2nd Officer.

18th August 1964. Between 2310 and 2345 GMT a wide band of greyish-white water, with a clearly defined edge was seen about 150 yd from the ship, running in a 170°–350° direction. The further distant edge was not visible. No sparkle was seen in the band, but when the beam from the Aldis lamp was directed upon the surface, the area subjected to the light would glow quite vividly. The glow would gradually diminish in intensity when the lamp was switched off and disappeared entirely about 5 sec afterwards. Sea temp. 74°F.

Position of ship: 7° 11' N, 76° 55'E.

*Note.* Dr. R. H. Kay of the University Laboratory of Physiology, Oxford, writes:

"Reports like these, of the effect of bright light on luminescence are beginning to accumulate

and promise to yield a most valuable set of data for analysis. I already hope to include some quite detailed observations of this sort in the next number of *The Marine Observer*. (See *The Marine Observer* for Jan. 1965, pp. 15–16, for the sort of observations we would like to receive.)"

## ABNORMAL REFRACTION

### Western North Atlantic

s.s. *Ramore Head*. Captain J. J. Gomez. Port Alfred to Liverpool.

31st May 1964. At 1400 GMT, a layer of haze, dark grey in colour and with a clearly defined upper surface, was seen all round the horizon. One ship appeared to be completely inverted and an iceberg which was not visible to the naked eye, seemed to be hanging upside down from the top of the layer. There was no cloud in the sky. Air temp. 40°F, wet bulb 39·5°, sea 39°.

Position of ship: 47° 16'N, 50° 11'W.

### Eastern Mediterranean

m.v. *Calchas*. Captain D. H. Stewart, R.D. Birkenhead to Port Said. Observer, Mr. D. H. Clark, Chief Officer, Mr. P. J. Morgan, 3rd Officer and Mr. P. Dawson, 4th Officer.

9th August 1964. At 1600 GMT an image of a crescent moon approx. 10° above the

horizon was seen to partly overlap the true moon, the image being slightly above it as shown in the diagram. Air temp. 78°F, wet bulb 73·5°, sea 78°. Visibility very good. Sky cloudless. Wind WNW force 3.

Position of ship: 32°N, 31°E.

## LUNAR HALO

### North Pacific Ocean

m.v. *Linkmoor*. Captain F. B. Lamb. Cuba to Japan. Observer, Mr. R. W. Storey, 2nd Officer.

1st July 1964. At 1440 GMT, when the moon's altitude was 26° 05', a halo of 22½° radius was seen. By 1550 the cloud layer had thickened and the radius of the halo was then 25½°. The cloud thinned out later and by 1645 the halo had again assumed a radius of 22½°. The breaks in the halo were due to gaps in the cloud, in that part of the sky. In addition to the Ci and Cs, some Cb and Cu were also present. Air temp. 77°F, wet bulb 72°, sea 78°.

Position of ship: 29° 20'N, 161° 25' E.

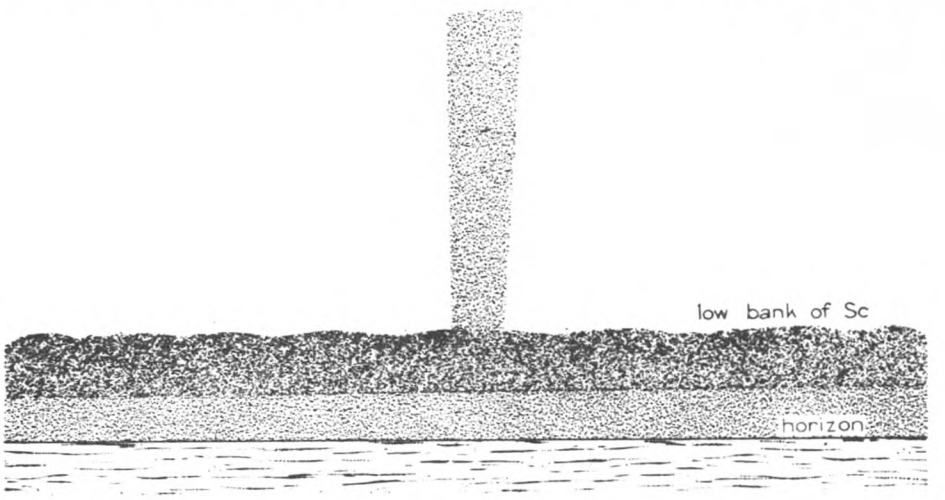
## SUN PILLAR

### off S.W. Ireland

s.s. *New York City*. Captain F. W. Harris. Avonmouth to Montreal. Observers, Mr. P. J. Wright, Chief Officer and Mr. D. G. H. Smith, 2nd Officer.

25th June 1964. During twilight between 0350 and 0430 GMT a bright red

column of light was observed in the direction in which the sun was due to rise. It began at the top of a bank of Sc on the horizon, and extended to an elevation of 10°. The ray was vertical, with parallel sides and was $\frac{1}{2}$° in width. Above the Sc there was a layer of Cs below 45° (see sketch). Air temp. 58°F, wet bulb 57°, sea 60°. Wind, calm.




Position of ship: 51° 33′N, 10° 59′W.

*Note.* Sun pillars are produced in cloud composed of ice crystals, and it is believed that they occur when the crystals lie at a small angle to the horizontal.

## COLOURED BOW IN LOW STRATUS

### Bay of Biscay

s.s. *British Bombardier*. Captain P. G. Lowrie. Tripoli to Finnart.

29th September 1964. At 0900 GMT the sky was clear except for traces of Sc on the horizon, and the wind was light and variable, at about 2 kt. The wind swung round to the NE, force 4, bringing in a bank of low stratus. As this reached the vessel it was noticed that small patches of stratus fractus were passing over at mast height and that the sun was producing a type of rainbow effect. No actual precipitation was experienced, yet a 'rainbow' with the full spectrum clearly visible was seen to be hovering a few yd from the vessel below navigating bridge level. Shortly afterwards condensation was quite noticeable on windows and the horizon was hazy. The stratus never materialised into the solid bank it appeared to be from a distance: some higher, broken Sc was seen above the stratus fractus. At 0600: Air temp. 65°F, wet bulb 65°, sea 63°. Visibility $5\frac{1}{2}$ n. miles.

Position of ship: 46° 03′N, 8° 25′W.

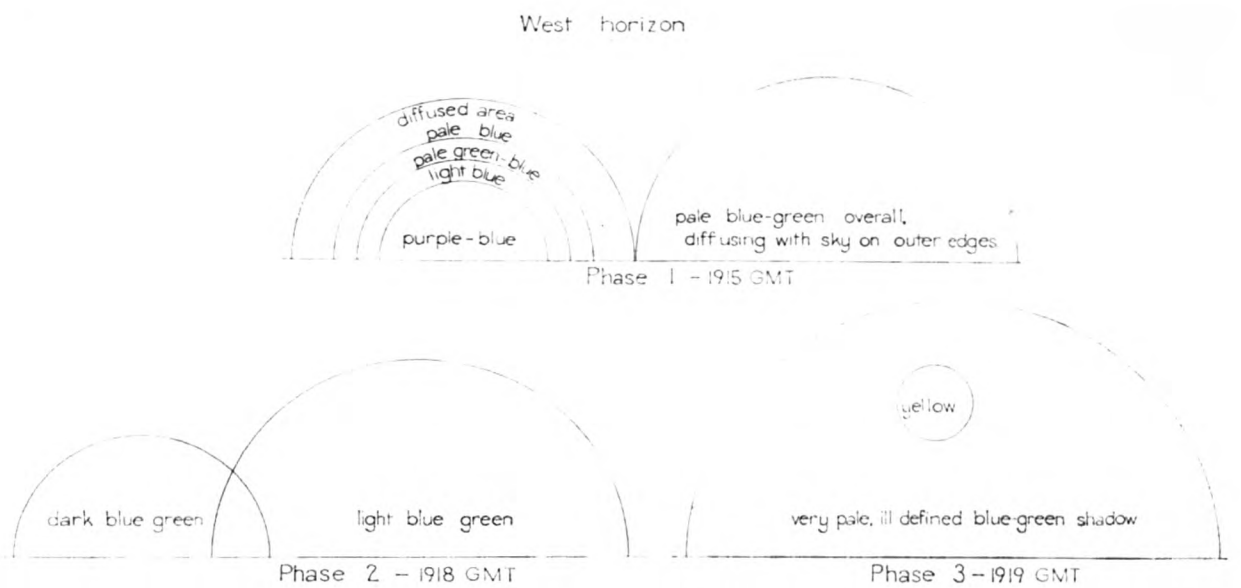
*Note.* When water droplets are as small as those produced by a vaporiser, they are so fine that a real rainbow cannot be seen in them, only a white mist-bow with blue and yellow edges. If here and there some larger drops are present the ordinary rainbow colours are momentarily seen. It would appear that the stratus cloud contained a certain amount of the larger drops needed, in view of the comment that condensation was quite noticeable on the windows.

## UNIDENTIFIED PHENOMENON

### Mediterranean Sea

m.v. *Great City*. Captain J. Vaughan. Houston (Texas) to India. Observers, Mr. P. D. Haworth, 3rd Officer and Mr. A. McGrady, Carpenter.

6th July 1964. At 1915 GMT approx., but definitely after sunset, the rings shown in the sketches appeared on the western horizon in the direction where the sun had set. They were distinct and the colour differentiation was well defined, but the shadow to the right was less so, though plainly seen. Within a short space of time the whole complex expanded, became lighter in colour and began to merge. With




no apparent warning a yellow disc appeared superimposed upon the very light shadow. It is stressed that the disc appeared and did not rise from the horizon. It rapidly diffused, increasing in size and becoming pale in colour until it finally merged with the now rapidly dispersing blue green shadow. All traces disappeared by 1925. This disc was estimated to be about 32′ in diameter and was seen at an altitude of 10°–15°. Sky cloudless. Air temp. 74·3°F, wet bulb 70·8°, sea 76°. Pressure (corrected) 1014·6 mb. Wind WNW force 2–3.

Position of ship: 34° 28′N, 20° 53′E.

## AURORA

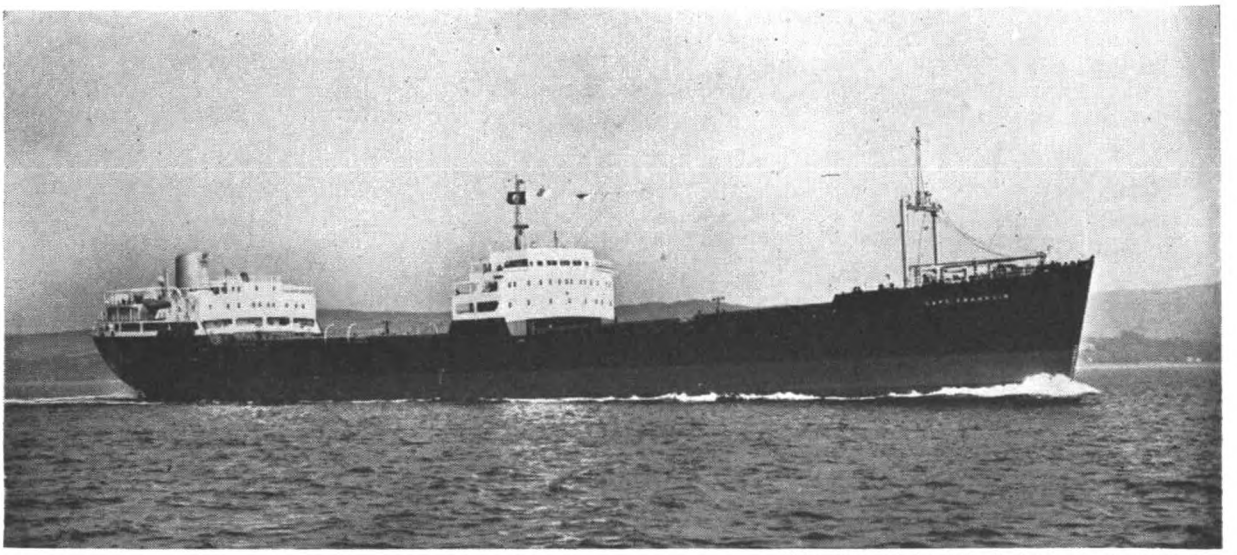
That the list of auroral observations made in British ships should be a short one is only to be expected at this time of minimum activity in the sunspot cycle. There were, however, several occasions during the period, July–September 1964, when the index figure for geomagnetic activity was up to 6, but the combination of long hours of daylight and cloudy conditions, particularly over the Atlantic Weather Stations, resulted in few sightings. A notable exception was on the night of 3rd–4th August, when observers in s.s. *Carinthia*, in the western Atlantic en route to Quebec, reported an auroral display spreading from the northern horizon and passing overhead until the southern limit was about latitude 52°N. Conditions allowed observers to record in detail the development and break up of the display and they added the interesting comment: "The light given off by the display was considerable, as large icebergs were sighted at distances up to 12½ miles."

Until satellites and/or other instruments take over the main work of registering aurora, we are dependent on visual observations for much of our data, and hope that observers in ships will continue to record, however briefly, all observations of auroral activity. We thank most sincerely those who give up their time to make these observations, and those at the Meteorological Office and Ocean Weather Ship Base who make sure that we get the reports at the Balfour Stewart Auroral Laboratory, Edinburgh University.

| Date (1964) | Ship | Geographic Position | $\Lambda$ | $\Phi$ | I | Time (GMT) | Forms |
|---|---|---|---|---|---|---|---|
| 4th Aug. | *Carinthia* | 53°24′N 49°48′W | 030 | 64 | +74 | 0030–0600 | All forms |
| 18th | *Weather Monitor* | 59°00′N 18°50′W | 070 | 65 | +72 | 0100 | N |
| 31st | *Weather Monitor* | 59°00′N 19°35′W | 070 | 65 | +72 | 2300–2400 | RR, N |
| 16th Sept. | *Weather Adviser* | 58°55′N 19°04′W | 070 | 65 | +72 | 2330–0230 | HA, RB, RR, N |
| 22nd | *Weather Adviser* | 59°04′N 19°03′W | 070 | 65 | +72 | 0150–0220 | RA, RB |
| | | | | | | 0550–0625 | N |
| 28th | *Weather Adviser* | 59°03′N 19°03′W | 070 | 65 | +72 | 2145 | N |
| 30th | *Weather Surveyor* | 58°50′N 18°30′W | 070 | 65 | +72 | 2050–0045 | RA, RR, N |

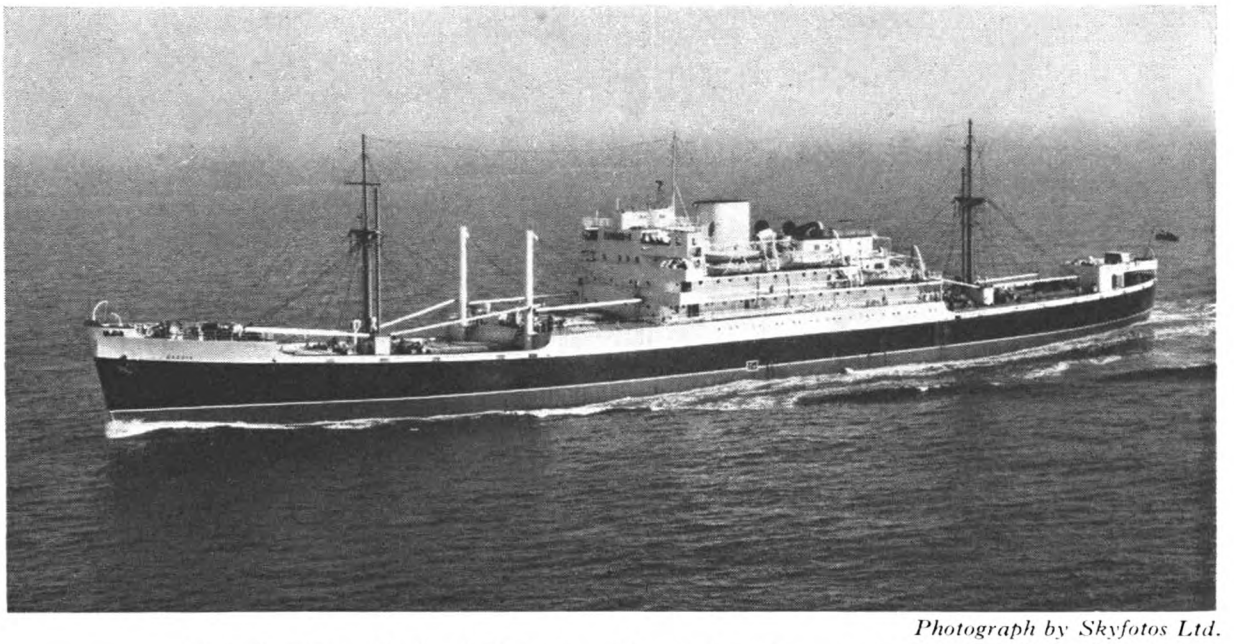
Key: $\Lambda$ = geomagnetic longitude; $\Phi$ = geomagnetic latitude; I = inclination; HA = homogeneous arc; HB = homogeneous band; RA = rayed arc; RB = rayed band; R(R) = ray(s); P = patch; V = veil; N = unidentified auroral form.

(*Opposite page 124*)



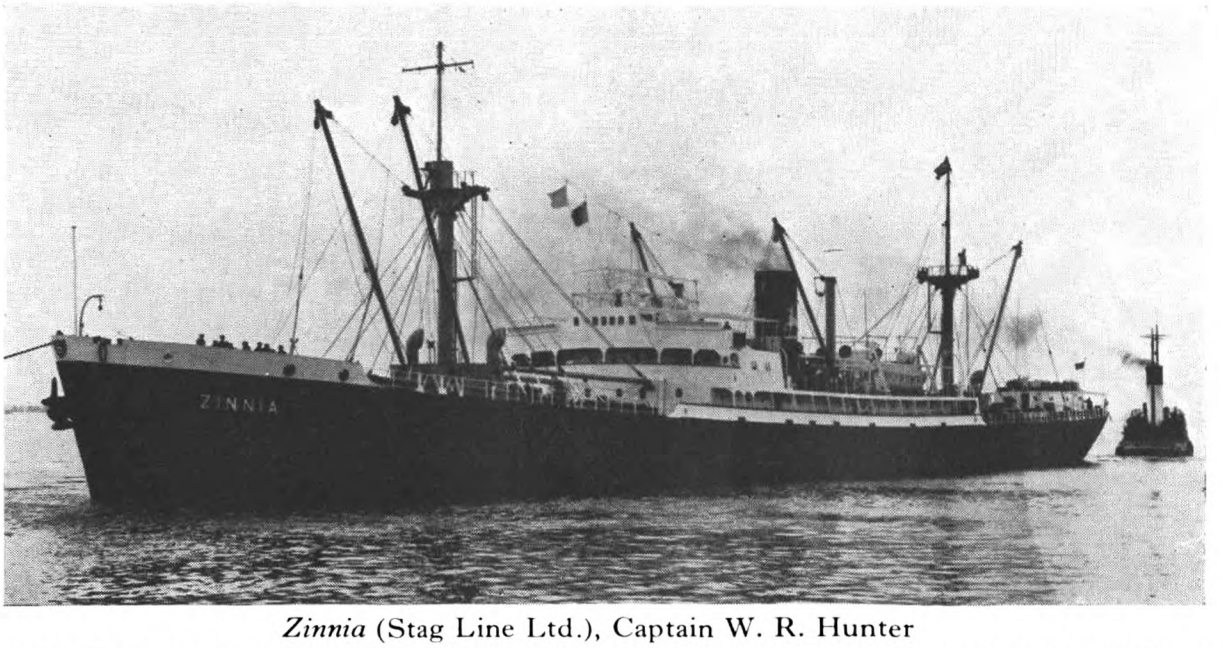
*Photograph by W. Ralston Ltd., Glasgow*

*Cape Franklin* (Lyle Shipping Co. Ltd.), Captain C. G. Mallett



*Photograph by Skyfotos Ltd.*

*Rakaia* (New Zealand Shipping Co. Ltd.), Captain F. S. Angus




*Zinnia* (Stag Line Ltd.), Captain W. R. Hunter

THE THREE SHIPS WHICH GAINED THE HIGHEST MARKINGS FOR THEIR METEOROLOGICAL LOGBOOKS DURING THE YEAR ENDED 31st MARCH 1965 (*see* page 105).

(Opposite page 125)

*Photograph by R. H. Brass*

The Swedish research ship *Sverdrup*—boat's crew from *Weather Reporter* in foreground (*see* page 130).

551.465.553(267)

# The Somali Current

## SOME OBSERVATIONS MADE ABOARD R.R.S. "DISCOVERY" DURING AUGUST 1964

By J. C. SWALLOW, PH.D.
(National Institute of Oceanography)

Although well known as one of the fastest currents to be found in the open sea, the Somali* current has until recently received relatively little attention from oceanographers.

Like the Gulf Stream and the Kuro Shio, it is a 'western-boundary current', a consequence mainly of the distribution of wind stress over the whole of the Indian Ocean, and not just driven by the local winds in its own area. Unlike the other western-boundary currents though, this one runs right across the equator (if the East African coast current is included as well), and it undergoes a seasonal reversal of direction.

Because of these unique features, one might hope that a study of the Somali current would lead to a better understanding of the mechanism of ocean currents in general, and how they respond to changes in wind stress, as well as being a necessary part of the exploration of the Indian Ocean.

Besides its significance for dynamical oceanography, the Somali current is important in relation to the biology of the Indian Ocean and, perhaps, its fisheries, since it appears to be connected with the upwelling of cold water off the northern part of the east coast of Somalia, near Ras Hafun. This upwelling water is rich in the chemical nutrients needed for the growth of plankton, and can have a great effect on the biological productivity of the sea.

In the course of the International Indian Ocean Expedition there have been opportunities for research ships to make observations on this neglected current. The work described here was done during August 1964—a month when under the influence of the south-west Monsoon, the Somali current is setting strongly to the northward—in co-operation with the U.S. research vessel *Argo*, operated by the University of California. Compared to the intensive surveys carried out in the Gulf Stream and other more accessible currents, this two-ship survey lasting little more than a month can only be regarded as a reconnaissance, and as yet only part of the results collected by the two ships have been worked up and compiled together. Nevertheless, they represent the most detailed survey yet made of the Somali current, and some features of interest in the results can already be pointed out.

The observations made by the two ships comprised mainly water-sampling, current-measuring by various different means, and plankton-sampling with vertical nets. Tracks were chosen to cross the current working from south to north in irregular zig-zags, interlaced to give the best coverage of the area in the available time. After meeting in Mombasa to discuss final details of the programme, the two ships worked independently, though in daily radio contact, coming within sight of each other only once during the cruise when they met off Ras Mabber to transfer equipment and data. This account will be confined to *Discovery's* share of the work, but first some explanation of the kind of observations made would perhaps be appropriate.

Water-sampling provides the basic means of identifying the water masses being transported by the current. It also makes possible the calculation of relative

* The Somali current is the name given nowadays by oceanographers to that portion of the East African coast current which is north of the equator, alongside the east coast of Somalia, and which reverses its direction during the north-east monsoon. In the *Indian Ocean Current Atlas*[1] and in Hydrographic Office publications (e.g., the *Africa Pilot*, Vol. 3) the whole of this current is termed the East African coast current.

geostrophic currents, since the distribution of density in the water, and hence pressure, can be calculated from measurements of temperature and salinity of the water at different depths.

These indirect calculations of currents are similar to the much more familiar process of estimating winds from the spacing of the isobars on a weather map, but they suffer from the disadvantage that only differences of current, from one level to another, can be calculated. On these sections across the Somali current, *Discovery* occupied water-sampling stations at 10-mile intervals close to the coast, opening out the spacing gradually to about 50 miles at the offshore ends of the longer sections. Samples were collected from about 30 depths between surface and bottom at typical deep stations, though at some stations sampling was limited to the upper 1,200 metres, with 22 sampling depths. Temperature and salinity were measured at all sampling depths, dissolved oxygen, phosphate, nitrate and silicate were measured in the upper layers and at selected depths in the deep water.

Current measurements were made by various means. At each water-sampling station, current shear was measured in the near-surface layers, using a pair of direct-reading current meters. One meter was streamed at a constant depth of 10 metres while the other was lowered and read at 10-metre intervals down to 200-metres depth. At stations where radar fixing was possible, whether on the coast or on an anchored buoy, the ship's movement over the ground could be determined and combined with the current-meter readings to give true currents. At other stations, the current-shear profiles were fitted to surface currents deduced in the usual way from dead-reckoning and celestial navigation. Fortunately the weather was reasonably clear.

Surface currents were also measured by the electromagnetic method, in which a cable carrying a pair of electrodes is towed astern of the ship. The voltage between the electrodes depends on the rate at which the cable is cutting the vertical component of the earth's magnetic field, and is a measure of the component of surface current across the ship's track. The component along the track is obtained by altering course at right angles for a few minutes, then returning to the original line. Unfortunately, the magnetic equator passes through the region where the Somali current becomes strongest, and the vertical component of the earth's magnetic field was too small for satisfactory working of the method north of 4°N.

For measuring deep water-movements, at depths of 1,000 metres and below, neutrally-buoyant floats were used. These consist of sealed aluminium tubes, loaded so as to sink to a pre-determined depth, where they have the same density as the surrounding water, but a lower compressibility so that they do not sink deeper. They carry small sound transmitters by means of which they can be located, as they drift freely with the deep current. Such deep-current measurements are slow and laborious to make, they need to extend over at least half a day, preferably more, and call for continuous accurate knowledge of the ship's position which, in that area, could only be obtained by radar fixing on the coast or on an anchored buoy. Consequently, only a few such measurements were made, but they are very useful as an indication of the speed and variability of deep-water movements, and as a guide in choosing a reference level for geostrophic calculations of currents.

Biological sampling consisted of vertical hauls with a closing net for zooplankton, through standard depth-intervals between 1,000 metres and the surface, measurements of chlorophyll and fine-mesh net hauls in the upper 100 metres of water, and surface tows with a net designed to sample only the top few centimetres of water.

Bathythermograph observations were made every half-hour on passage between stations, and sea surface temperature was recorded continuously. An account of the meteorological equipment and observations has already been published.[2]

*Discovery's* observations of the East African coast current began in late July, with a section of 9 stations extending from 300 miles offshore in towards the coast, on the way from Cape Amber towards Mombasa. At the offshore stations, surface currents were weak (less than ½ kt) and directed mainly in towards the coast.

Within 120 miles of the coast, the northward component of current increased, reaching 1 kt at 60 miles offshore, the maximum current observed being 2·7 kt only 20 miles from the coast. Closer in, there was a slight decrease. The current-shear measurements showed generally weak flow at 200 metres depth, most of the shear being within the thermocline below the warm surface-water. A buoy was anchored at the station 60 miles offshore, and a neutrally-buoyant float at 1,200 metres depth (only 200 metres off the bottom) moved north-east at nearly 0·4 kt. Although that may seem a weak current compared to those found at the surface, it is more than twice the average speed found at similar depths earlier in the cruise, and may imply substantial transport of deep water, below the main surface current. Unfortunately time did not permit any more deep-current measurements on that section. Approaching the coast, biological sampling with vertical nets was intensified, as plankton volumes increased from the usual low oceanic values.

Leaving Mombasa on 2nd August, the *Discovery* made a quick passage along the coast as far as 1°N, with a favourable wind and increasing surface current. At the first station, within 10 miles of the coast, combined current-meter observations and radar fixes indicated a surface current of 4·2 kt, decreasing with depth to about half-value at 100 metres. Working south-eastwards across the current, four more stations were occupied in a short section out to 60 miles from the coast. The current was narrow, decreasing to 2 kt at the surface at 23 miles offshore, though still running north-eastwards, parallel to the coast. Farther out along the section it decreased to about 1 kt and turned more northward. The current-shear at the two inshore stations was too strong for more than one wire to be used over the side at a time. Usually in the *Discovery* it had been possible to do water-sampling, current-meter observations, and vertical net hauls simultaneously but with each wire straying differently in the strong current, according to the depth and drag of the gear being used, each kind of observation had to be made separately, and the vessel manoeuvred to keep the single wire as near vertical as possible.

A second short section was then worked at 3°N, where a 2½-kt current was found in shallow water 8 miles offshore, but at 15 miles off, in deep water, the current was 4·7 kt, decreasing with depth to less than a knot at 200 metres. Farther out the current decreased, but not so sharply as in the first section; it was still 3 kt at 50 miles off. There were no signs of upwelling of cold water near the coast, on these short sections near the equator.

Next, a longer line of 10 stations, eastwards from the coast at 4½°N, was begun. Two sections made by the U.S. research vessel *Atlantis II* in 1963 had indicated a weak, broad countercurrent outside the main Somali current, and this was again observed by the *Discovery*. At the first station of this longer section, 5 miles from the coast, there was again a relatively weak current, but 10 miles farther out the current was running at 6 kt, to the northward with 4 kt of shear between surface and 100 metres depth. It was difficult working with even one wire over the side in the strong current, and only by rapid manoeuvring could anything like a vertical net haul be achieved. The water bottles sometimes failed to close properly, due to the drag of the current, and some casts had to be repeated several times. Despite the slow progress along the section, a full series of observations were made, with water sampling to the bottom and to 1,200 metres depth at alternate stations. The surface current decreased to 3 kt at 60 miles offshore, and was below 1 kt at 140 miles off. A buoy was anchored at that station, and a deep current of 0·4 kt towards the south-east, at 1,000 metres depth, was observed. Beyond 200 miles from the coast, a weak surface countercurrent, towards the south, was found.

Returning on a north-westward course, the *Discovery* soon came back into the main current, which exceeded 1 kt at 160 miles from the coast, and 2 kt at 100 miles. Further increase in current made it uneconomic to maintain the north-westward course of the section, and the later stations fall on a line running almost due north. The strongest surface current encountered was 6·9 kt, 22 miles offshore near 8°N, where the current was already beginning to turn away from the coast.

As would be expected in crossing a current from right to left, north of the equator, the depth of the near-surface isotherms had decreased steadily along the section, and within 20 miles of the coast the thermocline came to the surface, with a rapid decrease in surface temperature and current. Temperatures as low as 13·2°C (55·8°F) were found close inshore a little farther north, and as expected the cold water was relatively rich in nutrients. There was little evidence of plankton growth, however, in the coldest water, in fact the most obvious biological feature of that area was the number of dead fish seen on the surface, most probably killed by a sudden invasion of cold water. *Discovery* then worked north along the coast to Ras Hafun, and made another section north-eastwards towards Socotra. Surface temperatures remained below 20°C (68°F) out to 100 miles offshore, and currents in the cold water were relatively weak and variable, but predominantly northward. Returning from south of Socotra towards Cape Guardafui, warm water spreading from the Gulf of Aden was found on the surface, with the cold water moving northward below it. Only at these stations in the northern part of the cold-water area were abundant quantities of plankton found, with large numbers of larval fish. Remarkably few birds were seen, though they are usually abundant in upwelling areas.

After a brief visit to Aden, *Discovery* returned to the cold-water area to make further chemical and biological studies in the upwelling water. Seven station positions were chosen where it was hoped to find successive stages in the growth of plankton, and some further deep current measurements were made.

So far, there had been no measurements of deep currents under the strongest part of the surface current, although two observations, both showing only weak motion at 1,000 metres, had been made farther offshore during the last long section. Since the strongest current observed had been just within radar range of the coast, it was possible to keep track of neutrally-buoyant floats there without attempting to anchor a reference buoy (the buoys and moorings available were unsuitable for more than a 3-kt current, 100 metres thick). The surface current was found to be 6 kt on this second visit, and a weak southward movement was observed at 1,000 metres depth.

The ship then headed northward in a series of zig-zags, making half-hourly bathythermograph observations to delineate the boundary of the cold-water area, and the edge of the current, which turned more markedly eastward before reaching 10°N. A surface current measurement was made near 53°E, well out of radar range of the coast, by putting out a drogue attached to a buoy and tracking it relative to an acoustic marker laid on the sea floor. The surface current was 4·7 kt, slightly south of east. Soon after recovering the drogue and setting course northwards, the thermograph showed the expected drop in temperature on leaving the current, but this was followed quickly by a sharp rise, of 7°C (13°F), and next morning's stars indicated a north-westward set.

The cold water seemed to be drawn out into a narrow filament near $9\frac{1}{2}$°N 54°E, with opposing currents in the warm water on either side. The *Argo* noticed what was probably an extension of this feature, in the form of a less marked brief temperature drop in a north–south section on 55°E. *Discovery's* observation was made on 3rd September, in the dark, and shortage of time prevented further investigation of this strange situation. Two days later, however, the m.v. *Border Pele* passed through the same area, fortunately in daylight. The Master, Captain E. L. Lloyd, reported sighting a continuous line of breakers running NW–SE. Passing through the disturbance, the ship's head was deflected in a manner consistent with the suspected strong current-shear, and a drop in sea surface temperature was observed.*

Two more stations in the northern part of the cold-water area completed *Discovery's* work on the Somali current. In all, 61 stations had been occupied, and nearly 1,000 bathythermograph observations made. The work of checking thermo-

* I am indebted to Lieut.-Cdr. L. B. Philpott for passing on this report from the *Border Pele*.[3]

meter corrections, sorting plankton samples and identifying them, correcting current-meter readings and compiling the data into a usable form, is continuing, and the results will be published elsewhere as they become available. From the current measurements, it seems clear that there is a great increase in volume transport of the current, above the 200-metre level, once it has crossed the equator, and the extra water comes partly from below 200 metres and is partly drawn in from the eastern side of the current. The inflow from the side is most marked at a depth of about 150 metres, near the bottom of the warm surface layer and the top of the thermocline on the oceanic side of the current. The surface water, which by geostrophic calculation should follow the same course, seems to be held off by the frictional effect of the local wind. One is tempted to speculate whether this may stabilize the transport against variations in local winds, or whether perhaps the transport of the current may even be greater when the local wind is weaker.

As an aid in planning the Somali current work, charts of the winds and sea surface temperatures in the area were prepared on a larger scale than is used in M.O. 519,[4] from information kindly made available by the Meteorological Office. All the accumulated ship's reports from that area, for the months of July and August, were plotted, and the logs of ships reporting abnormally low temperatures were consulted. This information is essential in estimating to what extent the oceanographic observations, limited to very few years, may be representative of average conditions. The winds in August 1964, although strong enough, were somewhat weaker than had been expected. Abnormally low temperatures were found by the *Discovery* in the cold-water area, though these were generally close inshore and might not have been observed by ships on passage. The Naval Weather Service is co-operating in further study of surface temperatures in this area.

The upwelling of cold water near 8°N seems clearly to be related to the speed of the current and the increasing slope of the isotherms as the water moves northward from the equator. If the current had been weaker, it could have travelled farther north before the thermocline came to the surface, but when that has happened the current cannot continue north at the same speed and its only course is to turn east. The filament of cold water going south-eastwards, with opposing currents on either side, is a more puzzling feature, with some resemblance to an almost closed-off meander.

Any further reports of its occurrence, in 1964 or in other years, would be most welcome.

There are two practical points concerning the *Discovery's* observations which it may be appropriate to mention here. First, in cases where radar fixing was not available, and surface currents were calculated from dead reckoning and celestial fixes, the biggest uncertainty was in estimating leeway on passage, and its variation with the relative bearing of the wind. (Movement through the water on station was measured by the shallow current-meter, which was read at 5-minute intervals throughout each station.)

The second point concerns surface temperatures in the cold-water area. Temperatures observed with the bucket thermometer were systematically higher than those recorded on the thermograph, the discrepancy being greater at lower surface temperatures (or at larger air-sea temperature differences), and reaching 0·6°C (1·1°F) in extreme cases. Evidently the heat-exchange between warm air and cold sea was affecting only a thin layer of surface water and not reaching the thermograph sensor, which is sited well forward (not in the engine-room intake) at a depth of approximately 4 metres. At water-sampling stations in that area, it was noted that the thermometers on the shallowest bottle, at a nominal depth of 1 metre, showed temperatures intermediate between the bucket and the thermograph. This is mentioned here as an example of one way in which apparently genuine differences between bucket and intake temperatures could occur.

In conclusion, may I take this opportunity of expressing my thanks to all those concerned with collecting and processing the ships' observations that we have used,

and are using, in studying this area. May I also thank all those involved in the work of the R.R.S. *Discovery*, in particular Captain R. H. A. Davies, for his consistently helpful understanding in difficult conditions, and Mr. G. L. Swanson, Chief Officer, for his care in taking star sights.

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551.507.2:627.92

# Buoy Watching in the North Atlantic

By Captain J. Clark

(Master of the Ocean Weather Ship *Weather Reporter*)

During September 1964 the Ocean Weather Ship *Weather Reporter* while on Station 'Juliett' (52° 30'N, 20° 00'W) was involved, together with several Government survey ships of mixed nationalities, in an ambitious oceanographical survey of a section of the eastern North Atlantic. The method of executing this survey was broadly as follows. A marker buoy was laid and one ship assigned to the task of watching it. The buoy, and more frequently, the ship acting as buoy guardian, then provided a navigational check point for the other ships which were surveying areas around the buoy. *Weather Reporter* acted as buoy guardian and carried out an oceanographical programme which consisted of hourly bathythermograph soundings to 900 feet, and daily serial soundings to 300 metres. Reversing bottles were utilised for the serial soundings. The weather ship also, of course, continued to fulfil her normal function of hourly surface weather reporting, 6-hourly upper air soundings, and providing navigational assistance to transatlantic aircraft. In addition to the weather ship's normal 57-man crew three naval ratings were carried to assist with the special oceanographical programme.

Shortly before the start of the survey *Weather Reporter* stationed herself at the proposed site of the buoy and homed the Swedish research ship *Sverdrup* (see photograph opposite page 125) to this position by means of the weather ship's MF radiobeacon and main radar. On arrival *Sverdrup* commenced laying the buoy which weighed some 250 pounds. The buoy was laid in 1,531 fathoms of water using about 1,695 fathoms of ½-inch circumference steel wire rope to moor it. When *Sverdrup* finished laying the buoy she left to take up her position in the area she was assigned to survey, and *Weather Reporter* commenced her watch on the buoy.

The survey ships took periodic radar fixes from *Weather Reporter* and were supplied with the bearing and distance of the buoy from her by radio telephone. This method was used as the other ships were too far distant from the buoy to be able to take radar fixes directly from it. All ships had radar targets hoisted aloft to improve detection ranges.

The buoy can be described as consisting of a vertical, hollow, steel tube of 2½-inch diameter and some 22 feet in height. About one third from the bottom of the tube a spherical fibre-glass flotation chamber was fitted. This chamber was about 4 feet in diameter and contained two cylindrical 6-volt batteries, one of which supplied power to a flashing light which was fitted at the extreme top of the tube. The second battery

was a spare. A light sensitive switch and a flasher unit were clamped to the tube above the flotation chamber. A corner-type radar reflector was fitted near the top of the tube. At the bottom of the tube an iron weight provided stability. The mooring connection was at the bottom of the flotation chamber.

Sun and star sights combined with radar fixes were used to ensure that the buoy was staying in position. A long-range radio navigation-aid, LORAN, was also used for this purpose and was useful when cloud prevented sights. Between navigational fixes the ship's bearing and distance from the buoy were plotted at 15-minute intervals. This was done so that we would have some prompt knowledge of the buoy breaking adrift, but in the event, the fact that we seemed continually to be having to stop for bathythermograph soundings or serial soundings, or having to steam into wind to fill and launch an upper air balloon, or remain stopped during an upper air balloon ascent, more or less rendered the 15-minute plot valueless for its intended purpose. The plot, however, was most useful when we lost contact with the buoy and always helped us to find it quickly.

We found that the best radar results on the buoy were obtained at ranges between 1½ and 3 miles. Inside 1½ miles the buoy response became lost in sea clutter. One of the survey ships reported that she was getting an occasional radar response from the buoy at 10-miles range.

The flashing light on the buoy was excellent whilst it was working, giving a brilliant blue–white flash at roughly 20-second intervals. This flash was impossible to miss if one was looking in a direction within 50 degrees on each side of it. Unfortunately however the flash period became very erratic during the second night, and failed altogether to appear on the third night. We now had to rely on radar to maintain contact with the buoy at night but we found that when we were within a range of 1 mile the buoy's radar reflector gave a most helpful reflection from our searchlight.

On the fourth day a boat was despatched to deposit a frogman* on the buoy in the hope that he might be able to bring the light back to life (see photograph opposite page 132). The frogman found that a battery lead was broken off. He attempted to connect the spare battery and managed to remove the defective battery and pass it into the boat. He described his experience on the buoy as being similar to riding a bucking horse, with the addition, of course, of being totally submerged at times. Not surprisingly, perhaps, the light again failed to function that night. The defective battery was brought back to the ship where it was repaired and checked for charge. On the fifth day the boat towed a rubber dinghy to the buoy and deposited it alongside. The two frogmen in the dinghy fitted the repaired battery and connected it to the flashing-light system. They had a very lively time and their dinghy was full of water by the time they finished their task. Alas, no light again that night, and the survey ships left the area as the first part of their survey was completed.

Next morning, the sixth day of our watch on the buoy, the buoy's position was checked by star sights and later by sights of the Sun and Venus and the buoy was found to be on the move. In this event *Weather Reporter* was required to recover the buoy and this we proceeded to do during the afternoon. Wind was strong from the west with occasional very heavy rain-squalls but the sea had not had a chance to build up to any extent and by six in the evening the buoy and some 1,530 fathoms of mooring wire had been recovered (see photograph opposite page 132). The mooring itself was not recovered. Up to this time weather had been very pleasant with light airs and breezes being the order of the day, but now the North Atlantic decided to show its teeth and the west wind increased during the night to force 9 and 10. The buoy however was safely on board and we could afford to snug down and await the return of the survey ships. They were to be absent for six days. It was decided that we would re-lay the buoy on the day before their expected return.

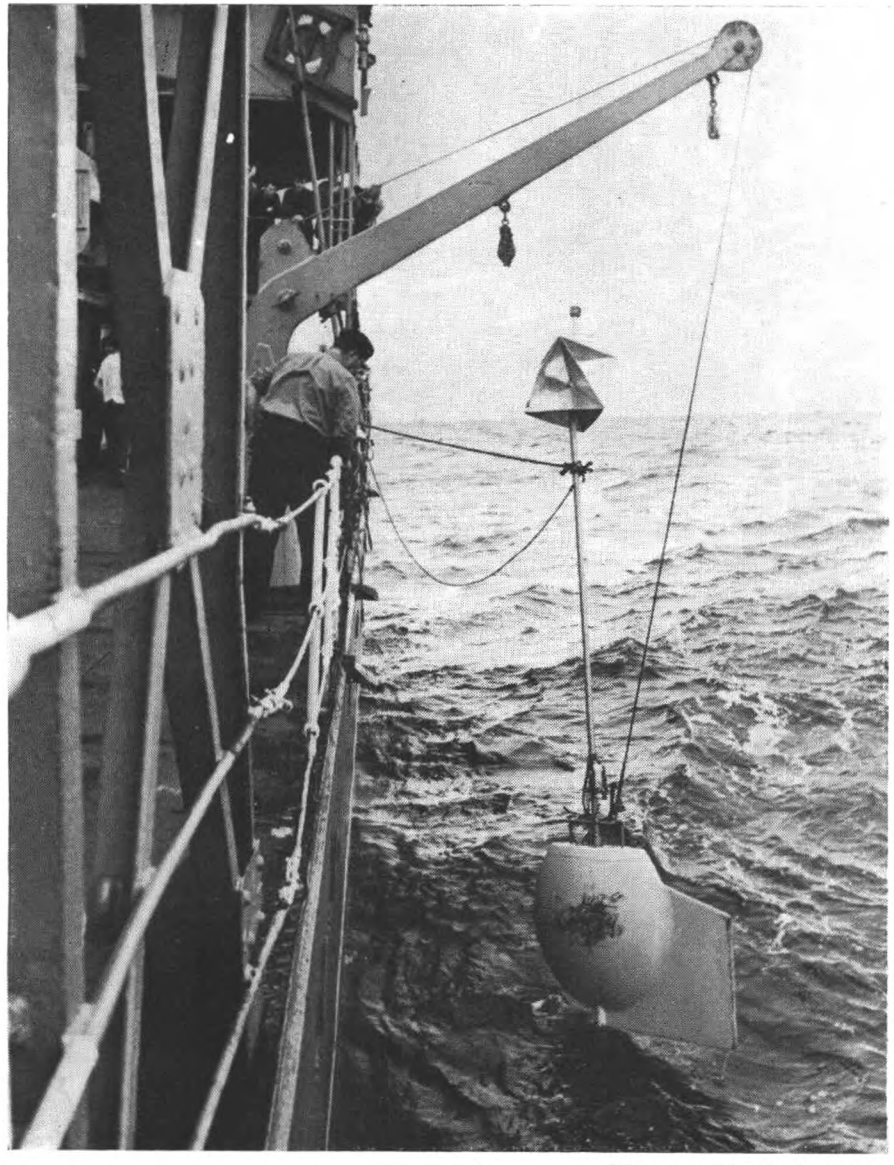
* The weather ships' frogmen, who are volunteers from the ship's company, are normally used in air/sea rescue duties for assisting survivors in the water, etc.

Meantime we continued with our normal weather ship duties and also with the special oceanographical programme. The storm exhausted itself within 24 hours but left us with rather unsettled weather.

Whilst the buoy was on board we had a good chance to study it and, if possible, put the flashing light back in working order. Both batteries proved to be holding a good charge and the ships' Electronics Officer fitted an additional small fixed light, using the spare battery as power source. This was by way of insurance against the flashing light again letting us down. Water was found to be present in the flasher-unit plug and when this was dried out the flashing light worked perfectly. This plug was bound with waterproof tape in an attempt to render it more watertight. The buoy staff was painted orange and reflective tape wrapped round it in places as we had previously had difficulty in seeing it. A split on the flotation chamber was repaired. A length of steel wire rope was spliced to the mooring wire we had recovered to bring it to its original length. Two blocks of concrete, each weighing about 120 pounds were chained together to form the new mooring and we were ready to go into the buoy-laying business.

On the day decided we started to lay the buoy after lunch, and had it laid in 1½ hours It was not floating as it should, however, and seemed to lack stability. It kept lying over on its side and sluggishly returning to the upright only to lie over the opposite way. When we had originally recovered it we had found two inflated rubber buoyancy-bags attached to the mooring wire a short distance below the buoy. When we relaid the buoy we had obviously placed these bags too close to the buoy and their buoyancy was countering the effect of the buoy's 'keel'. The boat was sent away with two frogmen and instructions to remove or puncture the bags. The frogmen were not able to do this and eventually compromised by attaching an additional weight to the buoy's keel. The buoy sat up nicely. That night the flashing light came on as darkness settled. Everything seemed to be going smoothly.

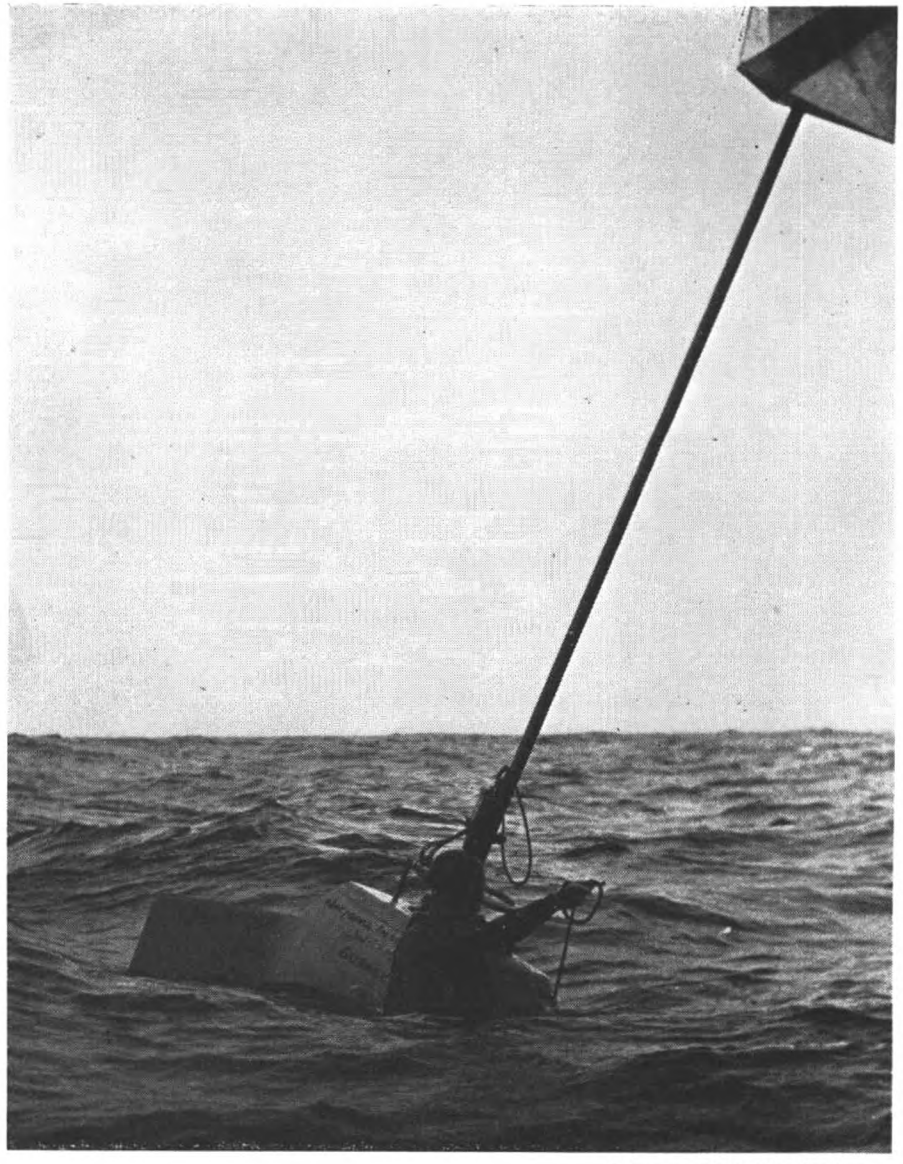
On the following night a strong southerly gale with heavy rain-squalls rendered life somewhat uncomfortable. Early in the evening the flashing light failed and we found that our auxiliary fixed light was not easy to see, particularly during rain-squalls. Sea clutter on the radar screen expanded and became more dense as the wind freshened and it was necessary to know the bearing of the buoy before one could identify it on the radar screen. It soon became evident that we were no longer receiving a radar response from the buoy and we spent the remainder of a miserable night circling the faint fixed light, which was our only means of keeping contact, and occasionally losing it in rain-squalls. Daylight showed that the buoy had lost its radar reflector and one of the rubber buoyancy-bags was seen floating away. The wind eased during the afternoon and a boat was sent off to fit a makeshift radar reflector, and to attempt to remove the weight which the frogmen had added to the keel. They managed to fit the radar reflector but were unable to remove the weight from the keel. The reflector, sad to relate, did not reflect, but the fixed light still performed bravely, and another night was spent circling the buoy at close range, although this time the weather was more kind. Next morning the buoy was floating very low in the water and obviously it was not going to last much longer. We attempted to recover it but it sank from sight as the ship approached to make the pick-up. For the remainder of the survey, *Weather Reporter* and, subsequently, her relief *Weather Monitor*, acted as navigational check point for the survey ships and by this means the survey was completed.



*Photograph by R. H. Brass*

Hoisting the oceanographic buoy aboard *Weather Reporter* for servicing and repair.

(*See* page 130.)

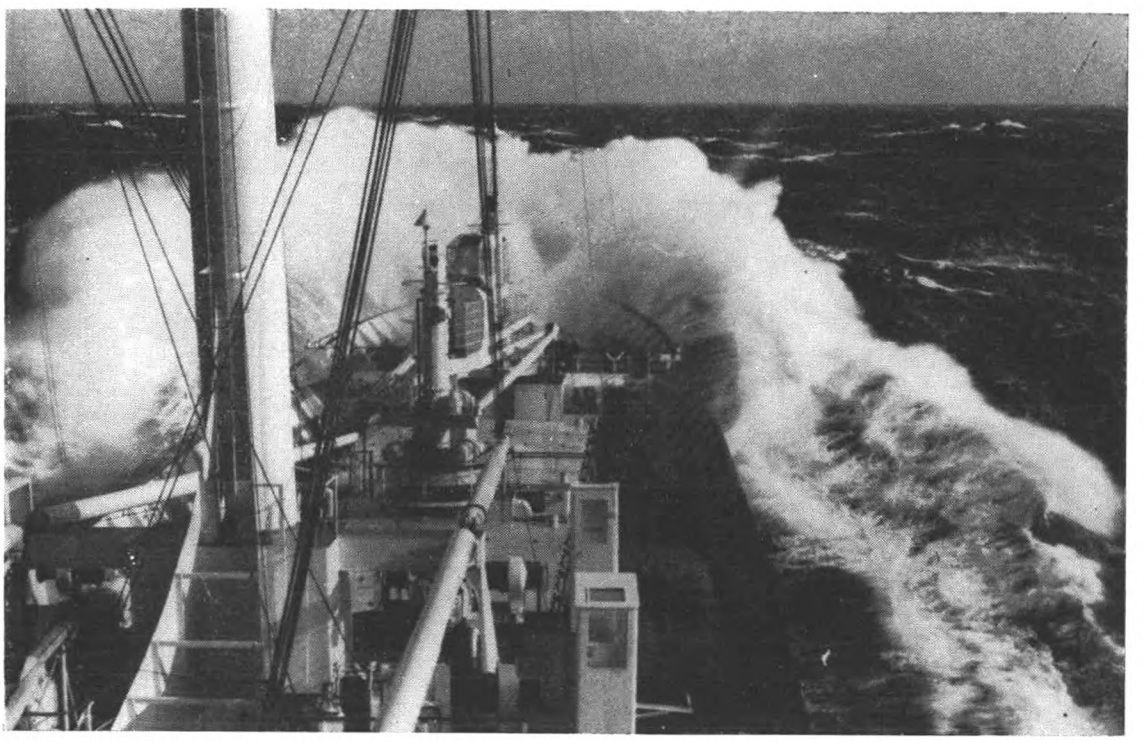


*Photograph by R. H. Brass*

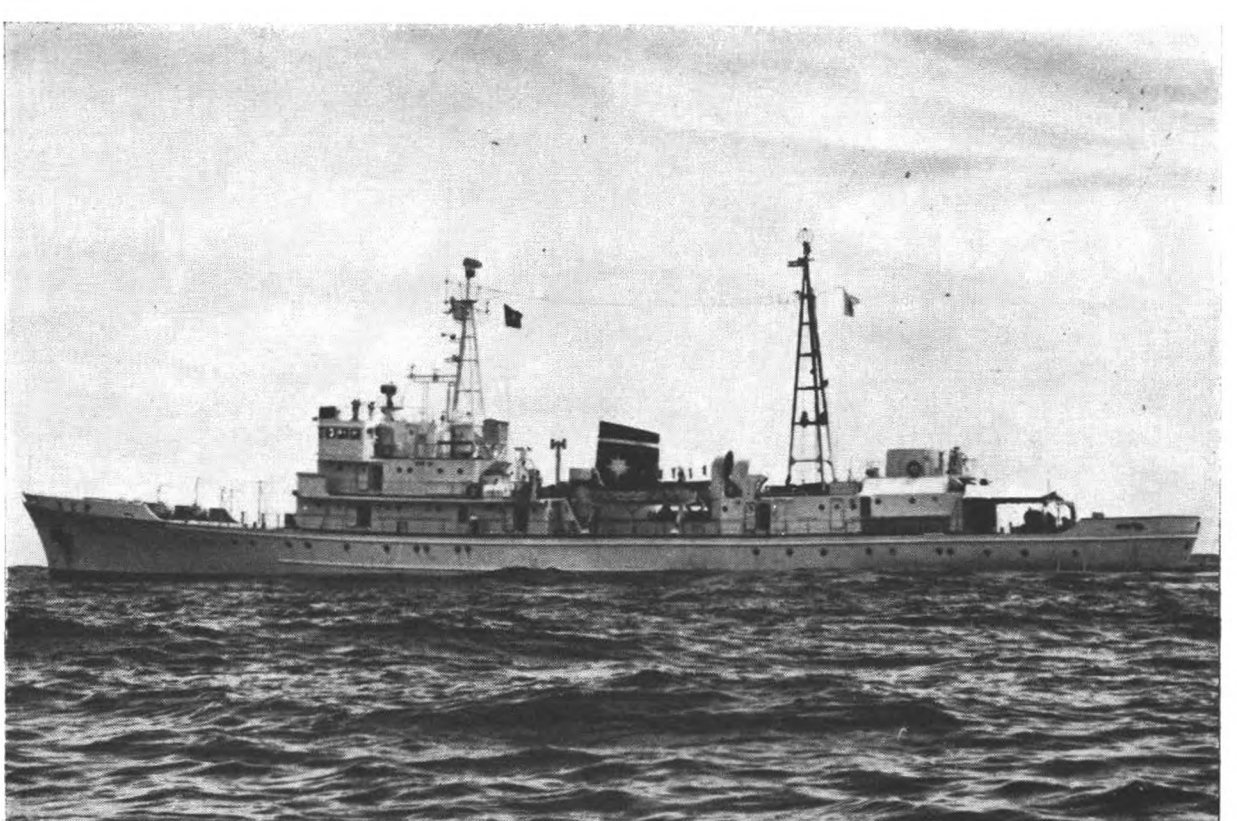
Frogmen from O.W.S. *Weather Reporter* tending the oceanographic buoy at ocean station 'Juliett'.

(*Opposite page* 129)

(*Opposite page 133*)



Winter Storms in South Australian waters observed from m. v. *Bulimba*. Line squall force 8 in the forenoon of 12th July 1964 (*see* page 109).



The Japanese Ocean Weather Ship *Ojika* (*see* page 133).

551.507.22

# The Japanese Ocean Weather Ships

By Y. SHIBATA
(Chief of the Marine Division of the Japan Meteorological Agency*)

## A brief history

On 22nd September 1946, the Japanese Government received an order from the Supreme Commander for Allied Powers to set up an ocean weather station 'X' at 39° 00'N, 153° 00'E in the North Pacific Ocean from 20th October 1947. Accordingly, the *Ryofu-maru*, a research motor-ship of the Central Meteorological Observatory (CMO) left Tokyo for station 'X' on 16th October, as the first Japanese weather ship.

At that time, four ships, the *Shinnan-maru*, *Chikubu-maru*, *Ikuma-maru* and *Ukuru-maru*—all frigates (770 tons) of the former Imperial Japanese Navy—were under conversion to ocean weather ships. As soon as the dock-work on the *Shinnan-maru* had been completed, she departed Tokyo for station 'X' on 1st November as the second ocean weather ship.

Subsequently, the *Chikubu-maru*, *Ukuru-maru*, *Ikuma-maru* were completely refitted and entered the service in March, April and October 1948, respectively.

On 6th August 1948, the Supreme Commander for Allied Powers ordered the Japanese Government to operate a radio beacon service in addition to making meteorological observations at station 'X'. This service was commenced by the *Ukuru-maru* which left Tokyo for station 'X' on 7th August.

On 30th August 1948, the Japanese Government received an order from the Supreme Commander for Allied Powers to establish another ocean weather station, 'T', at 29° 00'N, 135° 00'E off the southern coast of Japan. Consequently, the *Chikubu-maru* left Tokyo on 17th September for station 'T' as the first ocean weather ship on that station. Operation at station 'T' was suspended from 4th November 1948 to 12th June 1949 and again from 2nd November 1949 to 29th May 1950. A newly assigned ship, the *Shiga-maru* came into action on 8th March 1951 and since then, uninterrupted observations were carried out all the year round using these six ships until November 1953.

The so-called San Francisco Peace Treaty became effective in April 1952 and after negotiations between the Japanese and United States Governments, it was decided to continue observations at stations 'X' and 'T' under the mutual financial support of both countries—the ratio of the share in the expenses between Japan and the U.S.A. being one-to-four.

However, on 5th November 1953, the United States Government notified the Japanese Government that they would no longer share the expense of maintaining these two ocean weather stations after 1st December 1953. Staff members at the CMO and the Department of Finance tried unsuccessfully to find the necessary funds to maintain the ocean weather stations. So, as a result, the operation of stations 'X' and 'T' was suspended from 25th November 1953, but, at the same time, it was decided to operate station 'T' only for the period of six months in the summer, the so-called typhoon season.

For administrative reasons, the *Chikubu-maru*, *Ikuma-maru*, *Shinan-maru*, *Ukuru-maru* and *Shiga-maru*, which belonged to the CMO at that time, were transferred to the Maritime Safety Agency of Japan and their names changed to *Atsumi*, *Ojika*, *Tsugaru*, *Satsuma* and *Kojima* respectively.

In 1954 station 'T' was manned by the *Atsumi* and *Ojika* from 14th May to 25th November and since 1955 has been in operation for a period of six months every summer.

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* Since this article was written, Dr. Shibata has been appointed Director-General of the Japan Meteorological Agency.

## Japanese Ocean Weather Ships

At the present time, two new Japanese weather ships, the *Ojika* (see photograph opposite page 133) and *Nojima* serve alternately at station 'T'. These ships were built for observing and some particulars of the *Ojika* are shown below.

| | |
|---|---|
| Length, overall: 63·6 metres | Main engine: Diesel × 2 |
| Breadth: 9·2 metres | Horsepower: 1500 ps × 350 r.p.m. |
| Gross tonnage: 982·4 tons | Cruising speed: 17·2 knots |

Built: 10th June 1963

These ships are manned by the Maritime Safety Agency of Japan and the Japan Meteorological Agency (JMA) is in charge of the observations made on board. The total complement on each ship is 67, of whom 17 are meteorologists. The observations at station 'T' usually start in the latter part of May, and continue until the first part of November.

The instruments for meteorological and oceanographical observations on board are as follows.

| | |
|---|---|
| (*a*) *Marine meteorological instruments* | |
| Marine barometer | 1 |
| Recording barograph (for day) | 1 |
| Recording barograph (for week) | 1 |
| Ventilated psychrometer | 1 |
| Assman ventilated psychrometer | 1 |
| Recording thermograph (for day) | 1 |
| Three-cup anemometer | 1 |
| Propeller-type wind vane anemometer | 1 |
| Recorder | 1 |
| Recording pluviograph | 1 |
| (*b*) *Instruments for aerological observations* | |
| Radiosonde receiver | 2 |
| Marine theodolite for measuring winds aloft | 1 |
| (*c*) *Instruments for oceanographical observations* | |
| Electric winch 5 hp with wire (5,000 m) | 1 |
| Nansen bottle | 6 |
| Reversing thermometer (protected) | 12 |
| Reversing thermometer (unprotected) | 6 |
| Bathythermograph (0–300 m) | 2 |
| Surface water sampling bottle (10 l; for the measurement of radioactivity) | 2 |
| Dust collector (for the measurement of atomospheric radioactivity) | one set |

During each period of 18 days spent on station, a full programme of meteorological and oceanographical observations is carried out; surface maritime meteorological observations are normally made at 3-hourly intervals, but in special cases, hourly.

An upper air sounding is made every 12 hours, using a radiosonde of 408 Mc/s, sent up by a hydrogen-filled balloon of weight 600 grams. Information from the radiosonde aloft is obtained by the wireless receiving apparatus.

The balloon launching room is located at the stern of the ship. In rough weather, filling the balloon with hydrogen and launching a radiosonde is perhaps the most difficult and dangerous part of observation work, but fortunately has always been performed successfully.

Because of very limited space available, apparatus which occupies large space is inconvenient to have on board, and so upper winds are computed at 6-hourly intervals by the marine pilot-balloon theodolite, if weather permits.

Oceanographical work includes bathythermograph soundings to a depth of 250 metres once a day and sometimes deep soundings are made using reversing thermometers. These soundings which serve also to collect water samples from

pre-selected levels, reach down to depths of 1,000 metres. All this work is carried out by the meteorological staff on board. Samples of surface water and dust collected on board are brought ashore for analysis of the radioactivity contained in them.

Communications with the JMA, via coastal wireless stations, are maintained by the radio operators on the ship and observational data are sent in code by W/T.

Observations at station 'T' are carried out for the purpose of serving the studies of the 'Baiu' front in the rainy season, and typhoons. At the same time, the observations have an objective of protecting our mainland from severe damage by typhoons.

As for the data, all observational data obtained at both stations 'X' and 'T' are published in the JMA publication, entitled *The Results of Marine Meteorological and Oceanographical Observations.*

551.326.7(261)

## NOTES ON ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN FROM JANUARY TO MARCH 1965

JANUARY

*Relevant Weather Factors.* Monthly mean air temperatures over the sea areas from eastern Greenland to northern Russia were as much as 7°C below normal. Throughout the month depressions travelled north-eastwards along a track approximately from sea areas off eastern Canada to the Kara Sea. Early in the month there was much cyclonic activity over Baffin Bay and north-eastern Canada.

*Canadian Arctic Archipelago.* The season was light in the Far North otherwise the month of January had no outstanding characteristics.

*Baffin Bay.* Conditions were slightly more severe than normal. Over the whole area pack-ice was ridged and consolidated. Off the Greenland coast fast-ice more than 5-inches thick was observed. The depth of snow over the whole area was about 2 feet.

*Foxe Basin.* Ice cover was approximately normal with about half-a-foot of snow generally.

*Hudson Bay.* Up to December 1964 the season had been light but weather conditions became more severe during January 1965 particularly in the south of the region producing a predominantly normal ice situation. This consisted of a complete covering of close pack-ice over the deeper water and fast-ice over shallow water. The snow cover was about half-a-foot deep in the west of the region and up to 3-feet deep in the east and south.

*Hudson Strait.* The amounts and the extent of ice were slightly below normal, i.e. little or no open water. The depth of snow was generally about 1 foot.

*Davis Strait.* The concentration of ice and the position of the ice edge was approximately normal. Early in the month sea temperatures in the open sea were higher than normal.

*Labrador Sea.* The area of southerly, drifting, close pack-ice against the Labrador coast was well below normal. Atlantic water occupied most of the sea between the pack-ice and the Greenland coast. Sea surface temperatures between latitude 55° and 60°N were 1–2°C above normal. Only isolated icebergs were reported drifting south off the Labrador coast but 50 to 100 were observed by a land station west of Cape Farewell (southern Greenland). Only isolated 'bergs were apparent off west Greenland, north of 62°N.

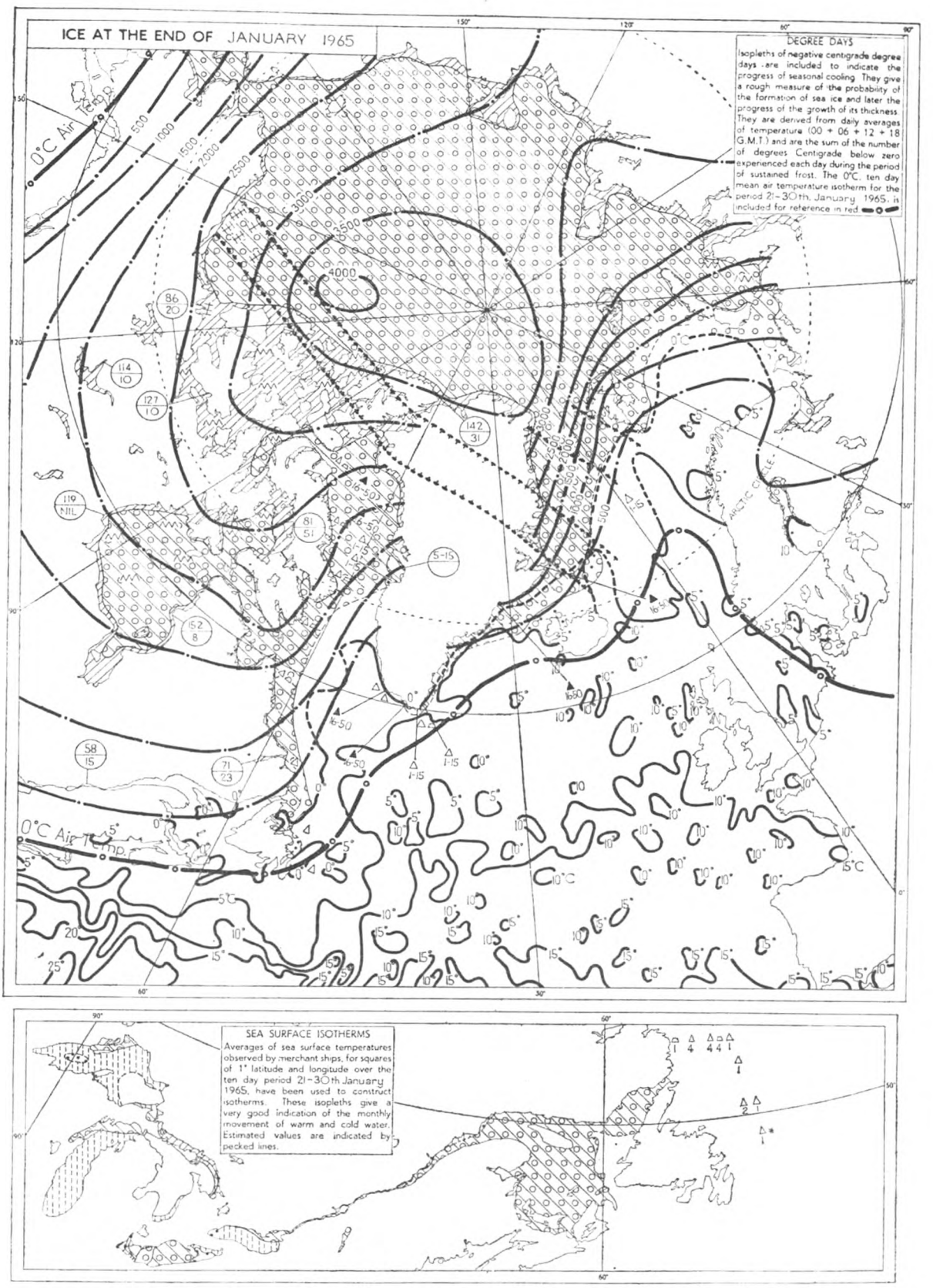
*East Newfoundland Waters and Great Bank.* Early in the month the amount and extent of pack-ice were below normal. Isolated icebergs were reported north of 53°N. However in the latter half of the month pack-ice, consisting mainly of close pack, drifted rapidly to the south and east, penetrating eastwards to 52°W and extending southwards to the Avalon Peninsula. Icebergs penetrated south of 49°N and east to 50°W. Water masses of northern origin covered most of the Great Bank.

*Belle Isle Strait.* There was pack-ice at the entrance to the Strait throughout January; towards the end of the month this increased sufficiently to close it.

*Gulf of St. Lawrence.* The amount of ice was generally below normal but from the middle of the month onward there was a rapid widespread formation of new ice which rapidly developed and consolidated. Over 3 feet of snow was reported during this period. However it was evident from the distribution of ice and sea surface temperatures that the warm Atlantic water continued to move into the Gulf along the south and west coasts of Newfoundland.

*Great Lakes and River St. Lawrence.* New ice began to form generally over the lakes late in the month. The season was therefore later than normal but ships were frozen into some ports of Lake Ontario early in the month. The River St. Lawrence appeared to be normal; it contained close winter pack-ice with fast-ice over shallow waters.

*Greenland Sea.* During most of this month the mass of ice off eastern Greenland was generally below normal. Atlantic water west of Spitzbergen had penetrated almost to 80°N.


ICE AT THE END OF JANUARY 1965
DEGREE DAYS
Isopleths of negative centigrade degree days are included to indicate the progress of seasonal cooling. They give a rough measure of the probability of the formation of sea ice and later the progress of the growth of its thickness. They are derived from daily averages of temperature (00 + 06 + 12 + 18 G.M.T.) and are the sum of the number of degrees Centigrade below zero experienced each day during the period of sustained frost. The 0°C. ten day mean air temperature isotherm for the period 21-30th. January 1965, is included for reference in red.
0°C Air Temp.
500
1000
1500
2000
2500
3000
3500
4000
86 20
114 10
127 10
142 31
119 NIL
81 51
5-15
52 8
58 15
71 23
16-50
1-15
0°C Air Temp.
SEA SURFACE ISOTHERMS
Averages of sea surface temperatures observed by merchant ships, for squares of 1° latitude and longitude over the ten day period 21-30th January 1965, have been used to construct isotherms. These isopleths give a very good indication of the monthly movement of warm and cold water. Estimated values are indicated by pecked lines.
Open water
Lead
Polynya
New or degenerate ice
Very open pack-ice (1/10 - 3/10 inc.)
Open pack-ice (4/10 - 6/10 inc.)
Close or very close pack-ice (7/10 - 9+/10 inc.)
Land-fast or continuous field ice (10/10) (no open water)
Ridged ice
Rafted ice
Puddled ice
Hummocked ice
(The symbols for hummocked and ridged ice etc., are superimposed on those giving concentration)
Extreme southern or eastern iceberg sighting
Ice depths in centimetres
Snow depths in centimetres
Y Young ice (2"-6" thick)
W Winter ice (6"-6½' thick)
P Polar ice (> 6½' thick)
A suffix to Y W P indicates the predominating size of ice floes
s small (11 - 220yd.)
m medium (220 - 880yd.)
b big (½ - 5miles)
v vast (>5miles)
c ice cake (< 11yd.)
Known boundary
Few bergs (< 20)
Many bergs (> 20)
Few growlers (< 100)
Many growlers (> 100)
Radar target (probable ice)
Against iceberg, growler or radar target symbols the date of observation may be put above and the number observed below
Position of reporting station
Radar boundary
Assumed boundary
Limit of visibility or observed data
Undercast
Cracks
Isopleths of degree days
0°C. air temperature isotherm
Max. limit of all known ice
Max. limit of close pack ice
Min. limit of close pack ice
Estimated general iceberg track. Very approximate rate of drift may be entered
Observed track of individual iceberg.
Approximate daily drift is entered in nautical miles beside arrow shaft
Note:-
The plotted symbols indicate predominating conditions within the given boundary. Data represented by shading with no boundary are estimated.

Towards the end of the month there was a dramatic change; there was a great increase in the southward and eastward drift of east Greenland polar, and winter pack-ice with a corresponding rapid southerly retreat of the Atlantic water. Over the whole of the month very severe freezing conditions prevailed generally in this area.

*Denmark Strait and Iceland.* Over the month as a whole there were normal seasonal developments.

*Barents Sea.* In general the ice season of the Barents Sea was slightly ahead of normal. However coastal areas in the south-east experienced above normal temperatures.

*White Sea.* The ice season was slightly ahead of normal and the area was generally covered with ice.

*Baltic Sea.* The amounts of ice in this area were well below normal throughout the month. There was fast and pack-ice in the Gulf of Finland and north of the Gulf of Bothnia at the end of the month. Ice thickness was a half to one foot. New ice formed generally in coastal regions over the whole of the Baltic. Sea temperatures in the open water well away from the ice were 1–3°C above normal.

FEBRUARY

*Relevant Weather Factors.* Mean monthly air temperatures over most of the polar basin and adjacent areas were as much as 10°C below normal but over Greenland and Baffin Bay they were up to 7°C above normal.

*Canadian Arctic Archipelago.* There were few developments in the ice situation apart from a decrease of approximately 1 foot in the depth of the general snow cover.

*Baffin Bay.* There were fluctuations in the area of open water off the Greenland coast otherwise the ice situation remained similar to that in January. Snow depths were approximately 2 feet over the Greenland coast and about 1 foot over the Canadian coast.

*Foxe Basin, Hudson Bay, Hudson Strait, Davis Strait and Labrador Sea.* Very little change apart from slight variation in snow cover.

*East Coast of Newfoundland and Great Bank.* There was little change in the area of pack-ice which extended 200 miles out from the Newfoundland coast. The southern tip of the pack reached 47°N. There were about 80 icebergs sighted during the month but none penetrated east of 50°W or south of 47°N.

*Belle Isle Strait.* The Strait remained closed by pack-ice at its entrance but little of this ice moved towards the Gulf of St. Lawrence through the Strait. The general depth of snow cover was about 1 foot.

*Gulf of St. Lawrence.* The pack-ice consolidated particularly in the shallow areas of the Gulf, e.g. around Prince Edward Island, Chaleur Bay and in the north of the Gulf. Ice thickness in many places reached 3 feet and there was much hummocking. Pack-ice moved extensively through Cabot Strait and severely obstructed navigation on the southern side.

*Great Lakes and River St. Lawrence.* There was much open water in Lakes Superior, Huron and Ontario. There was little change in the ice in the River but much open water appeared towards the Estuary (east of 71°W).

*Greenland Sea, Spitzbergen and Bear Island.* The area of pack-ice off eastern Greenland was largely normal but that of the polar and winter pack moving east and south extended well beyond normal limits almost to Bear Island, Jan Mayen and approaching the north coast of Iceland. Open and very open pack extended beyond the above places. The iceberg population appeared below normal and individual land stations reported less than 15 icebergs off the east coast of Greenland.

*Denmark Strait and Iceland.* North of 65°N the area of pack was in excess of normal, approaching, and at times contacting, north-west Iceland. Pack-ice also moved round from the north to the eastern side of Iceland. South of 65°N the area of pack-ice was below normal. Individual land stations in Greenland reported mainly less than 15 icebergs off the coast but occasionally up to 50 were observed.

*Barents Sea.* Ice in the south-east of the Barents Sea continued less than normal, elsewhere it was in excess of normal except east and south of Spitzbergen where the ice was apparently normal.

*White Sea.* Little change from January.

*Baltic Sea.* All types of ice increased in the north of the Gulf of Bothnia, in the east of the Gulf of Finland and in the Gulf of Riga. Extensive areas of fast and pack-ice between Sweden and Denmark, in the Aaland Islands and in coastal waters of the southern Baltic had developed by the end of the month. However this continued to be a light ice year.

MARCH

*Relevant Weather Factors.* Monthly mean air temperatures over an area extending from Greenland to Scandinavia and thence to the Russian Arctic were as much as 6°C below normal; northern Canada and Alaska were up to 10°C above normal. Snowfall was below normal over most of the Polar Basin but above normal over Greenland and most of Canada. An intense north to north-easterly wind covered the Greenland Sea and the adjacent Arctic. This had persisted with variable intensity since January.

**Table 1. Icebergs sighted by merchant ships in the North Atlantic**

*(This does not include growlers or radar targets)*

| Limits of Latitude and Longitude | | Degrees North and West | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 66 | 64 | 62 | 60 | 58 | 56 | 54 | 52 | 50 | 48 | 46 | 44 |
| Number of bergs reported south of limit | January | * | * | * | * | * | 31 | 15 | 5 | 1 | 0 | 0 | 0 |
| | February | * | >268 | >248 | >235 | >199 | >151 | >119 | >80 | >30 | >3 | 0 | 0 |
| | March | * | * | 214 | 213 | 192 | 168 | 146 | 108 | 102 | 43 | 7 | 0 |
| | Total | * | * | * | * | * | >350 | >280 | >193 | >133 | >46 | 7 | 0 |
| Number of bergs reported east of limit | January | * | * | * | * | * | 31 | 10 | 5 | 0 | 0 | 0 | 0 |
| | February | >268 | >266 | >227 | >179 | >137 | >133 | >91 | >7 | >3 | 0 | 0 | 0 |
| | March | * | 214 | 210 | 184 | 159 | 153 | 91 | 42 | 25 | 5 | 1 | 0 |
| | Total | * | * | * | * | * | >317 | >192 | >54 | >28 | 5 | 1 | 0 |
| Extreme southern limit | January | .. | | | | 48° 23′N, 50° 00′W on 25.1.65 | | | | | | | |
| | February | | | | | 47° 25′N, 49° 42′W on 16.2.65 | | | | | | | |
| | March | | | | | 45° 24′N, 46° 04′W on 30.3.65 | | | | | | | |
| Extreme eastern limit | January | | | | | 48° 23′N, 50° 00′W on 25.1.65 | | | | | | | |
| | February | | | | | 47° 32′N, 49° 18′W on 11.2.65 | | | | | | | |
| | March | | | | | 45° 29′N, 45° 50′W on 30.3.65 | | | | | | | |

* Probably large numbers, but none sighted in excess of those reported in further south positions or in further east positions.

> ("greater than") has been inserted where there is some doubt as to the actual number of icebergs at some of the sightings, but the true value is probably greater than the value given.

## Table 2. Baltic Ice Summary: January—March 1965

No ice was reported at the following stations during the Period: Kiel, Bremerhaven, Flensburg, Aarhus, Kristiansandfjord.

| Station | January 1965 | | | | | | | | | February 1965 | | | | | | | | | March 1965 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Length of Season | | Ice Days | | | Navigation Conditions | | | Accumulated Degree Days | Length of Season | | Ice Days | | | Navigation Conditions | | | Accumulated Degree Days | Length of Season | | Ice Days | | | Navigation Conditions | | | Accumulated Degree Days |
| | A | B | C | D | E | F | G | H | I | A | B | C | D | E | F | G | H | I | A | B | C | D | E | F | G | H | 1 |
| Tonning | 1 | 5 | 5 | 0 | 5 | 5 | 0 | 0 | — | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | — | 2 | 12 | 11 | 1 | 9 | 6 | 1 | 0 | — |
| Husum | 1 | 5 | 5 | 0 | 5 | 4 | 0 | 0 | — | 1 | 28 | 3 | 0 | 0 | 0 | 0 | 0 | — | 1 | 9 | 9 | 0 | 0 | 6 | 0 | 0 | — |
| Emden | 3 | 3 | 1 | 0 | 1 | 1 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — |
| Lubeck | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | 10 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | — |
| Gluckstadt | 4 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | — | 1 | 28 | 6 | 0 | 0 | 3 | 0 | 0 | — | 1 | 8 | 8 | 0 | 7 | 8 | 0 | 0 | — |
| Riga | 12 | 31 | 13 | 3 | 1 | 5 | 0 | 0 | 149 | 2 | 28 | 27 | 23 | 3 | 25 | 1 | 0 | 349 | 1 | 30 | 30 | 17 | 13 | 9 | 17 | 0 | 459 |
| Pyarnu | 1 | 31 | 31 | 0 | 0 | 0 | 31 | 0 | 120 | 1 | 28 | 28 | 28 | 0 | 0 | 28 | 0 | 297 | 1 | 31 | 31 | 31 | 0 | 0 | 31 | 0 | 369 |
| Leningrad | 1 | 31 | 31 | 23 | 8 | 6 | 25 | 0 | 383 | 1 | 28 | 28 | 28 | 0 | 0 | 28 | 0 | 657 | 1 | 31 | 31 | 26 | 5 | 10 | 21 | 0 | 788 |
| Viborg | 1 | 31 | 31 | 31 | 0 | 0 | 31 | 0 | — | 1 | 28 | 28 | 28 | 0 | 0 | 28 | 0 | — | 1 | 31 | 31 | 31 | 0 | 0 | 9 | 22 | — |
| Stettin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 24 | 28 | 2 | 0 | 0 | 2 | 0 | 0 | 61 | 1 | 21 | 21 | 0 | 18 | 19 | 1 | 0 | 46 |
| Gdansk | 11 | 23 | 4 | 0 | 2 | 2 | 0 | 0 | 11 | 25 | 25 | 1 | 0 | 0 | 0 | 0 | 0 | 78 | 4 | 14 | 8 | 0 | 0 | 4 | 0 | 0 | 50 |
| Klaipeda | 11 | 29 | 11 | 1 | 0 | 11 | 0 | 0 | 80 | 9 | 28 | 12 | 0 | 0 | 10 | 0 | 0 | 250 | 2 | 28 | 13 | 0 | 0 | 8 | 0 | 0 | 317 |
| Tallin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | — | 10 | 28 | 17 | 2 | 12 | 14 | 3 | 0 | — | 1 | 19 | 19 | 0 | 19 | 6 | 13 | 0 | — |
| Ventspils | 21 | 21 | 1 | 0 | 0 | 0 | 0 | 0 | — | 8 | 28 | 20 | 0 | 1 | 4 | 0 | 0 | — | 1 | 28 | 16 | 8 | 0 | 15 | 0 | 0 | — |
| Helsinki | 1 | 31 | 26 | 21 | 0 | 24 | 0 | 0 | 231 | 1 | 28 | 28 | 28 | 0 | 5 | 23 | 0 | 451 | 1 | 31 | 31 | 31 | 0 | 0 | 31 | 0 | 572 |
| Mariehamn | 11 | 11 | 1 | 0 | 0 | 1 | 0 | 0 | 82 | 19 | 28 | 7 | 2 | 0 | 4 | 0 | 0 | 208 | 1 | 30 | 30 | 7 | 3 | 25 | 0 | 0 | 315 |
| W. Norrskar | 27 | 31 | 5 | 0 | 4 | 5 | 0 | 0 | — | 1 | 28 | 24 | 0 | 16 | 14 | 5 | 0 | — | 1 | 31 | 31 | 4 | 27 | 0 | 11 | 20 | — |
| Turku | 1 | 31 | 11 | 5 | 0 | 8 | 0 | 0 | 176 | 1 | 28 | 28 | 23 | 0 | 28 | 0 | 0 | 358 | 1 | 31 | 31 | 18 | 0 | 17 | 14 | 0 | 469 |
| Vaasa | 1 | 31 | 31 | 31 | 0 | 1 | 30 | 0 | 324 | 1 | 28 | 28 | 28 | 0 | 0 | 27 | 1 | 512 | 1 | 31 | 31 | 31 | 0 | 0 | 11 | 20 | 661 |
| Mantyluoto | 9 | 31 | 11 | 0 | 2 | 5 | 5 | 0 | — | 1 | 28 | 24 | 2 | 5 | 15 | 3 | 0 | — | 1 | 31 | 31 | 31 | 0 | 1 | 30 | 0 | — |
| Lulea | 1 | 31 | 31 | 31 | 0 | 0 | 26 | 5 | 591 | 1 | 28 | 28 | 28 | 0 | 0 | 0 | 28 | 826 | 1 | 31 | 31 | 31 | 0 | 0 | 0 | 31 | 1048 |
| Bredskar | 1 | 31 | 29 | 2 | 1 | 28 | 0 | 0 | — | 1 | 28 | 22 | 1 | 0 | 9 | 0 | 0 | — | 1 | 29 | 29 | 6 | 4 | 24 | 0 | 0 | — |
| Stockholm | 1 | 31 | 31 | 14 | 0 | 31 | 0 | 0 | 109 | 1 | 28 | 28 | 3 | 0 | 28 | 0 | 0 | 224 | 1 | 31 | 31 | 29 | 2 | 31 | 0 | 0 | 264 |
| Kalmar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 9 | 28 | 15 | 6 | 4 | 11 | 0 | 0 | 134 | 1 | 27 | 27 | 12 | 13 | 26 | 0 | 0 | 170 |
| Visby | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 91 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 118 |
| Goteborg | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 |
| Skelletea | 1 | 31 | 31 | 9 | 6 | 31 | 0 | 0 | — | 1 | 28 | 28 | 23 | 0 | 22 | 0 | 3 | — | 1 | 31 | 31 | 31 | 0 | 0 | 0 | 31 | — |
| Roytaa | 1 | 31 | 31 | 31 | 0 | 0 | 0 | 31 | — | 1 | 28 | 28 | 28 | 0 | 0 | 0 | 28 | — | 1 | 31 | 31 | 31 | 0 | 0 | 0 | 31 | — |
| Copenhagen | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 2 | 9 | 8 | 0 | 2 | 0 | 6 | 0 | 8 |
| Oslo | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 187 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 280 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 308 |

CODE:

A First day ice reported.
B Last day ice reported.
C No. of days that ice was reported.
D No. of days continuous landfast ice.
E No. of days of pack-ice.
F No. of days dangerous to navigation, but assistance not required.
G No. of days assistance required.
H No. of days closed to navigation.
I Accumulated degree-days of air temperature (°C) where known.*

* These figures give a rough measure of first the probability of the formation of sea ice, and later the progress of the growth and of its thickness. They are derived from daily averages of temperature (00 + 06 + 12 + 18 GMT) and are the sum of the number of the degrees celsius below zero experienced each day during the period of sustained frost.

*Canadian Arctic Archipelago.* Again there were very little developments in this area but aircraft reported that in the Beaufort Sea conditions were very variable. Early in the month there was almost a completely continuous covering of consolidated ice but towards the end of the month large areas of open water appeared. Snow cover early in the month was 1–3 feet which decreased to less than 1 foot.

*Baffin Bay.* The variable development of open water on the Greenland coast continued. Land stations near Disko reported up to 100 icebergs. The movement of Atlantic water northwards along the coast of western Greenland was not evident, i.e. along the eastern edge of the ice.

*Foxe Basin, Hudson Bay and Hudson Strait.* Little change in the ice situation.

*Davis Strait.* The extent of the pack-ice off Baffin Island at latitude 65°N increased, otherwise there were few developments.

*Labrador Sea.* The extent of the pack-ice off the Labrador coast decreased except between 56–58°N where it extended seawards to 57°W.

*East Newfoundland Coastal Waters and Great Bank.* The pack-ice began melting rapidly and south-west Newfoundland became clear but Arctic water and associated pack-ice and icebergs continued to drift south and eastwards. The pack-ice almost reached 47°N, 50°W and icebergs 45°N, 45°W.

*Belle Isle Strait.* The pack-ice obstructing the entrance to the Strait decreased. The area and extent of the ice at the entrance and within the Strait was very much below normal.

*Gulf of St Lawrence.* This was a period of great fluctuation in the ice situation. At the end of the month, large areas of open water existed in the centre of the Gulf south of Anticosti Island, in the Estuary and to the north of the Gulf. Pack-ice continued to move through the southern half of Cabot Strait south-eastwards into the Atlantic extending almost to 44°N, 58°W. The serious obstruction to navigation on the southern half of Cabot Strait continued. Snow cover was generally reported less than 1 foot deep.

*Great Lakes and River St. Lawrence.* Throughout the month there was little change but by the end of the month a widespread and rapid decrease in the ice in the lakes had begun and there was a break-up of ice in the River. However from time to time low temperatures caused new ice to form.

*Greenland Sea, Spitzbergen and Bear Island.* The situation in February continued on into March. The pack-ice moved on to the north coast of Iceland, obstructing the passage of ships and making fishing difficult or impossible. Late in the month, however, warm water appeared to be advancing west and north-westwards to the west of Spitzbergen and the pack-ice was giving way rapidly; this period of excessive east Greenland ice appeared to be ending. At longitude 15°W and between latitude 73° and 75°N movement of an ice island showed that the pack-ice was moving steadily southwards at approximately 9 nautical miles a day.

*Denmark Strait and Iceland.* Very little change except that the Atlantic water was penetrating northwards, east and west of Iceland.

*Barents Sea.* There were few changes in February in the situation but polar pack appeared to be moving south-westwards beyond Bear Island.

*White Sea.* The ice situation remained similar to that of February.

*Baltic Sea.* The ice situation changed little early in the month but towards the end the ice was clearing rapidly everywhere and little remained south of 58°N.

*Note.* The notes in this article are based on information plotted on ice charts each month, similar to the map above, but on a much larger scale (39 in × 27 in). They are available at the price of reproduction on application to the Director-General, Meteorological Office (Met.O.1), London Road, Bracknell, Berks. Alternatively, they may be seen at any Port Meteorological Office or Merchant Navy Agency.

G. A. T.

# Book Review

*Queens' Company*, by Commodore Donald MacLean, D.S.C., R.D., R.N.R. 8½ in × 5½ in, pp. 228, *illus.*, Hutchinson & Co. Ltd., 178 Great Portland Street, London, W.1, 1965. Price: 30*s*.

This book is an autobiography of a distinguished seaman who served with the Cunard Line from Apprentice to Commodore of the Line, and Master of the world's largest ship, *Queen Elizabeth*. His narrative is told with a convincing sincerity.

A native of Stornoway where so many fine seamen are bred, it is not surprising that at an early age Donald MacLean should have felt a burning desire to become a sailor. His mother's wise determination that he should first have a sound education

kept him at school until reaching the age of 18; rather longer than was normal at that period when a lad joining the Merchant Navy as an apprentice usually left school at 16, and often younger.

His destiny was decided, when, as a member of the Stornoway Sea Cadet Corps he was one of a few fortunate cadets to be presented to Lord Inverclyde, then Chairman of the Cunard Line, visiting Stornoway in his yacht *Beryl* in the year 1917. The favourable impression young Donald made on his Lordship resulted in an offer of an apprenticeship with the Company, in whose service he remained until his retirement in 1962. His account of his early days at sea will give many mariners of his generation a touch of nostalgia.

Much of the book is devoted to the author's service in the Royal Navy as a Royal Naval Reserve officer. After the usual qualifying courses for promotion to the rank of lieutenant, his subsequent training before 1939 was spent in submarines. He relates some unusual and interesting experiences in this branch of the Service. His war service from 1939–46 included a period in armed Merchant Cruisers as Gunnery and Chief Boarding Officer, command of a German Prize—his first command, several important staff appointments and command of a sloop engaged on Russian convoy escort duty. His war service gained him early promotion to the rank of Commander R.N.R. and the award of the Distinguished Service Cross.

Nearly half the book is devoted to his post-war service with the Cunard Line. His promotion was fairly rapid after rejoining the Company on demobilisation in 1946. After a short spell as First Officer of the *Georgic*, and a brief period ashore as Assistant Marine Superintendent at Southampton, he was appointed Master of the cargo ship *Samsurf*. He describes a voyage round the world in this ship which tested his resourcefulness to the full when faced with some very remarkable problems. From command of the *Samsurf* he was appointed Chief Officer of the *Queen Elizabeth*, followed not long afterwards by an appointment as Staff Captain of the *Queen Mary*. In 1950 came his first passenger ship command, the *Media*. Between 1950 and 1962, the year of his retirement, he commanded a number of the Company's famous ships including *Caronia*, *Queen Mary* and *Queen Elizabeth*. His account of his service during this period gives a very clear insight into the exacting duties of the Master of a large passenger ship.

A most interesting and readable book which will certainly be enjoyed by all with a love of ships and the sea; it is an inspiration to all on the threshold of a sea career.

A. D. W.

# Personalities

OBITUARY.—We regret to report the sudden death at sea of COMMANDER C. W. ARMSTRONG, R.D., R.N.R. He collapsed and died aboard his ship, *Kenilworth Castle*, bound from Middlesbrough to Antwerp.

Cyril William Armstrong went to sea in 1927 when he joined the Ellerman City Line. On obtaining his Master's Certificate in 1937 he joined the Union Castle Line as 4th Officer. As an R.N.R. officer he was mobilised for active service in 1939 and served for most of the war in minesweepers. He was three times Mentioned in Despatches.

In 1946 he returned to the service of the Union Castle Line and was promoted Master in 1956.

His association with the Meteorological Office began in 1937 when he submitted his first meteorological logbook as 4th Officer of the *Llanstephan Castle*. Of the total of 25 logbooks received from Commander Armstrong 5 were classified as 'excellent.'

We offer our sincere sympathy to his widow and son.

A. D. W.

RETIREMENT.—CAPTAIN L. T. PETERSON retired in March when he brought the *Andes* into Southampton.

Leslie Tully Peterson was born in 1903 of seafaring ancestors; his great grandfather, grandfather and father were all shipmasters. His son is now following the family tradition.

He received his early training in H.M.S. *Conway* in 1920–21 and in 1922 joined the Royal Mail Steam Packet Company's *Navasota* as Apprentice. He spent his entire seafaring career in this company.

In 1925 he passed for second mate and was appointed 4th Officer of the *Darro*. He obtained his Master's Certificate in 1933 and was appointed to his first command, the *Teviot*, in 1949.

Captain Peterson confesses to a completely placid career. So placid in fact that he thinks that Lloyds must pray for men with his good luck. But he has earned two unusual distinctions; firstly in being elected an Honorary Citizen of the State of Florida and secondly by having a grove of a hundred trees planted in his name in Israel. Both these honours were conferred on him whilst he was master of the cruising liner *Andes*. He also holds an honorary marine licence as pilot for the Panama Canal.

Captain Peterson's association with the Meteorological Office goes back to 1926 when he was in the *Darro*. Since then he has, in 24 years, sent us 50 meteorological logbooks. He received an Excellent Award in 1933 for his voluntary work in the *Deseado*.

We wish him health and happiness in his retirement.

L. B. P.

# Notice to Mariners

## BBC FORECASTS FOR SHIPPING

Since 17th April 1965, the forecast for the coastal waters of Scotland has been broadcast by the Scottish Home Service (809 kc/s, 371 m) on Sundays, as well as during the rest of the week. The times of the broadcasts are Monday to Friday 2308 clocktime and Saturdays and Sundays 2345 (both times are approximate). The forecast of wind, weather and visibility is followed by the 2200 reports of wind direction and force, weather and visibility from the following stations: Machrihanish (Kintyre), Tiree, Stornoway, Wick, Aberdeen (Dyce) and Leuchars.

# Notice to Marine Observers

## PORT METEOROLOGICAL AGENT, SYDNEY, N.S.W.

We regret to record the death, on 7th December 1964, of Captain J. A. Doyle, Port Meteorological Agent in Sydney, N.S.W. In notifying us of this sad event the Director of the Commonwealth Bureau of Meteorology in Australia writes:

"Captain Doyle was a most energetic Port Meteorological Agent and quickly secured the confidence of shipmasters after his appointment. During his few years as Port Meteorological Agent Sydney, he was very successful in promoting our marine meteorological service."

The Australian Bureau of Meteorology has appointed Captain C. L. Wheeler as their Agent in Sydney. He is a shipmaster of twelve years' standing and has twenty-five years seagoing experience.

Captain Wheeler may be contacted through the Sydney Bureau of Meteorology, telephone 71.4416.

# Fleet Lists

## GREAT BRITAIN (Information dated 31.3.65)

The following is a list of British ships which have been equipped with instruments and which voluntarily co-operate with the Marine Division of the Meteorological Office.

The names of the Captains, Observing Officers and Senior Radio Officers are given as ascertained from the last written returns received. The date of receipt of the last return received is given in the second column; an asterisk indicates a new recruitment who has not yet sent in a logbook.

All returns received from observing ships will be acknowledged, direct to the ship, by the Marine Superintendent of the Meteorological Office.

The Port Meteorological Officers and Merchant Navy Agents will make personal calls on the Captains and Observing Officers as opportunity offers, or on notification from the ship at any time when their services are desired.

Excellent Awards are made at the end of each financial year. The names of the Captains, Principal Observing Officers and Senior Radio Officers gaining these awards are published each July in *The Marine Observer*.

It is requested that prior notification of changes of service, probable periods of lay-up, transfer of Captain, or other circumstances which may prevent the continuance of voluntary meteorological service at sea, may be made to a Port Meteorological Officer or Merchant Navy Agent, or to the Marine Superintendent of the Meteorological Office at Bracknell.

Captains and Officers are invited to point out any errors or omissions which may occur in the list.

### Selected Ships

| Name of Vessel | Last Return Received | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|---|
| *Accra* | 15.9.64 | F. St. H. Webber | J. D. Read, C. J. Mackrell, D. J. Rooke, —. Hollom | M. F. Conroy | Elder Dempster Lines |
| *Achilles* | 26.2.65 | R. G. Boyd | E. Genochio, B. Edmonds, M. McCarthy | B. V. Jones | A. Holt & Co. |
| *Adelaide Star* | 15.6.64 | C. R. Horton | | | Blue Star Line |
| *Aden* | 8.12.64 | W. B. Thompson | M. H. Julian, T. Sutton, D. A. Rodger | D. B. Drummond | P. & O.-Orient Line |
| *Adventurer* | 14.12.64 | L. J. Sharman, R.D. | C. E. E. Jones, J. B. Dodds, D. R. Sowden, N. Kaladeen | P. Goulden | Harrison Line |
| *Africa* | 19.1.65 | R. T. Welch | B. E. L. Kay, L. Mounsey, B. Lloyd, N. J. Lacey | P. M. Lockhart | Shaw Savill Line |
| *Alaunia* | * | T. H. Davies | B. C. Goulothorpe, A. Cattell, B. Brush | B. Farrow | Cunard Line |
| *Albany* | 21.10.64 | C. D. Ratcliff | H. R. Mason, R. A. M. Brown, J. H. Frain, J. Neary | J. J. Daley | Royal Mail Lines |
| *Albistan* | 19.10.64 | W. Mackenzie | J. Alexander | V. Patterson | Strick Line |
| *Aldersgate* | 18.3.65 | H. H. Howey | H. N. Lawson, V. Isidoro, W. Noble, M. Crawford | J. Rush | Silver Line |
| *Alert* | 5.6.64 | J. P. Ruddock, O.B.E. | | | H.M. Postmaster General |
| *Alinda* | 2.10.64 | H. Moncaster | R. M. Harrison, W. Miller, D. H. Rayfield, J. H. Gadsdon | T. A. McCormack | Shell Tankers (U.K.) Ltd. |
| *Alva Bay* | 10.3.65 | L. L. Wellings | D. Koeppen | B. P. Jones | Alva S.S. Co. Ltd. |
| *Amalric* | 10.3.64 | F. Charnley | D. Sweet, I. S. M. Conde, R. M. Newton | R. G. Davry | Shaw Savill Line |
| *Amazon* | 9.9.64 | G. S. Grant, R.D. | M. Odgers, G. Nickson, K. Lancaster, R. Dole | F. Goodall | Royal Mail Lines |
| *Amoria* | 20.11.64 | C. D. Micheal, M.B.E. | J. R. Ashley, C. G. Pogue, J. McP. Pratt, P. Blackshaw | C. Duggan | Shell Tankers (U.K.) Ltd. |
| *Andania* | 24.3.65 | J. G. Bradley, R.D. | E. G. Marshall, D. F. Potter, G. Buckley, A. Dunster | A. M'L. Adams | Cunard Line |
| *Andes* | 11.12.64 | G. A. Gibbons | D. J. Glennie, J. Riley, S. B. Lewarn, R. Masson | G. Stennet | Royal Mail Lines |
| *Apapa* | 24.9.64 | J. A. Brooke | C. Weaver, M. Johanson, P. Willerton, T. J. Craig | G. I. Gilling | Elder Dempster Lines |
| *Aragon* | 7.10.64 | W. S. Thomas | H. G. Evans, D. Shaw, B. Hotter, E. Clements | W. Rollason | Royal Mail Lines |
| *Araluen* | 7.1.65 | R. Willcocks | K. A. MacLeod, M. J. Butler, P. Butcher | | Trinder Anderson & Co. |
| *Aramaic* | 28.1.65 | D. Aberdeen | D. M. Cole, T. R. Barton, W. Virtue, J. C. Blake | F. Kirk | Shaw Savill Line |
| *Argentina Star* | 21.5.64 | E. R. Pearce, O.B.E. | R. Brisset, J. M. Thomson, D. R. Cripps, M. R. Sutcliffe | M. Barker | Blue Star Line |
| *Argyllshire* | 1.2.65 | I. C. Scott | D. B. M. Murphy, D. H. Mueschen, P. J. LeCher, T. H. B. Bryans | G. W. G. Martyn, M.B.E. | Clan Line |
| *Arlanza* | 28.12.64 | T. W. F. Bolland | B. H. M. Usill, W. C. Carruthers, J. C. Jardine | | Royal Mail Lines |
| *Arthur Albright* | 16.12.64 | S. J. Bristowe | M. Dearness | R. A. Gosman | James Fisher & Co. Ltd. |
| *Asphalion* | 23.11.64 | J. T. Knox | R. G. Pritchard, A. J. Palmer, J. J. Brookes, J. Dunn | T. B. Ward | A. Holt & Co. |

## Selected Ships (*contd.*)

| Name of Vessel | Last Return Received | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|---|
| *Astyanax* | 18.1.65 | C. S. Mackinnon | P. A. Read, H. A. Sanderson, P. M. Watt | J. B. Carr | A. Holt & Co. |
| *Athelcrest* | 6.9.63 | J. M. Lloyd | W. A. Woodward, N. A. Porter, J. Sensier | | Athel Line Ltd. |
| *Athelmere* | 28.1.65 | C. Roberts | A. Carrington, E. Cheney, W. Bradley, A. Notman | | Athel Line Ltd. |
| *Athelprince* | 7.2.64 | J. P. Coffey | J. McCourt, D. C. Williams, R. Davies, J. H. Nelson | R. Cooper | Athel Line Ltd. |
| *Athelviscount* | * | D. G. Billing | B. R. Smith, E. Pollock, A. J. Travers-Wakeford | | Athel Line Ltd. |
| *Athenic* | 6.1.65 | C. H. Heywood | R. Gilliland, B. A. Hills, J. B. Fowler, P. E. Storey | H. D. Bray | Shaw Savill Line |
| *Athlone Castle* | 13.11.64 | J. D. B. Fisher | D. H. Jackson, I. Dale, A. Dick, D. C. Peters | H. G. Liggins | Union Castle Line |
| *Aureol* | 18.11.64 | W. E. Humphreys | H. Hathaway | J. Noonan | Elder Dempster Lines |
| *Australind* | 23.2.65 | H. G. Chafer | H. D. Mann, R. J. Higgins, R. M. Saunders | R. Sykes | Trinder Anderson & Co. |
| *Author* | 25.9.64 | W. E. Williams | B. Sutcliffe, J. A. Hughes, G. Batchelor | F. Murrant | Harrison Line |
| *Avon Ranger* | 19.2.65 | F. Osler | P. A. E. Charlton, A. J. Mitchell, J. A. Attwater, J. M. Begg | P. B. Killeen | London & Overseas Freighters Ltd. |
| *Ayrshire* | 4.2.65 | P. MacMillan | B. D. Thomson, D. F. Meredith, A. T. Campbell, R. McLachlan | G. L. Macindoe | Clan Line |
| *Baltistan* | 26.6.64 | J. F. Ockleford | C. A. Baker, J. Kane, B. J. Bartlett, M. Robinson | A. N. Stevens | Strick Line |
| *Bamburgh Castle* | 12.10.64 | T. E. Lakin | F. W. Allen, G. Sandecock, K. Anderson, J. Gyte | S. J. Bowes | W. A. Souter & Co. Ltd. |
| *Bankura* | 21.9.64 | W. S. Howcroft | R. Henderson, T. E. Roderick, P. J. Pedersen | D. Wilson | British India Line |
| *Baron Ardrossan* | 18.3.63 | T. B. McLeod | D. M. Cowell, T. Gilmour, J. Kirk | D. D. Rocca | Hogarth Line |
| *Barrister* | 28.12.64 | R. Suttcliffe | J. Pearson, A. F. Perry, S. J. P. Lamerton | F. Howard | Harrison Line |
| *Baskerville* | 24.2.65 | C. A. Smith | | | Canatlantic Ltd. |
| *Bassano* | 22.1.65 | B. Waldie | R. W. Barrett, D. Robinson, M. Chinn, M. Salisbury | W. H. Cartwright | Ellerman's Wilson Line |
| *Beaverash* | 8.2.65 | R. Walgate | P. Mansell, D. Lewis, C. E. Turner | | Canadian Pacific Line |
| *Beaverbank* | 22.9.64 | D. Campbell | F. Hunter, M. H. Dunkerley, H. Martin | J. W. Halpin | Bank Line |
| *Beaverelm* | 27.5.64 | W. E. Williams | A. Kenyon, F. W. Pickup, H. A. Jones, R. T. King | D. Picot | Canadian Pacific Line |
| *Beaverpine* | 28.12.64 | J. A. N. Besant | S. Lawrence, R. J. Mackay | J. C. Denman | Canadian Pacific Line |
| *Benarmin* | 19.10.64 | J. C. Harvey | N. A. Ross, E. P. Anderton, I. A. Hamilton | T. Shannon | Ben Line |
| *Benarty* | 28.12.64 | C. Donnelly | G. R. Cullen, A. Ross, D. Barr | W. Paterson | Ben Line |
| *Bencleuch* | 3.12.64 | R. S. Lumsden | T. J. Clark, I. R. Ansell, J. D. Lewthwaite | J. M. Alston | Ben Line |
| *Benhope* | 13.8.64 | W. D. Cowie | R. G. N. Aiken, A. E. Johnstone, T. S. Sutherland, T. C. Clure | G. Morrison | Ben Line |
| *Benlomond* | 17.3.65 | D. S. Sinclair | N. MacDonald, E. Travers, A. Greig | W. G. Watt | Ben Line |
| *Benrinnes* | 12.10.64 | R. Griffiths | W. C. McKay, W. J. Milne, J. L. Stoker | W. Parkinson, M.B.E. | Ben Line |
| *Benvannoch* | 11.1.65 | J. Kinnaird | T. R. Moyes, A. F. Kidd, H. A. Blain | | Ben Line |
| *Bhamo* | 14.12.64 | J. C. Gibson | N. Powell, N. Gordon | | Henderson Line |
| *Bishopsgate* | 11.11.64 | J. B. Wyness | J. N. McCaughey, —. McGregor, W. Wilson | | Silver Line |
| *Bombala* | 19.6.64 | D. M. Gill | R. Strudwick, R. Alderman, A. Barker, H. B. Chambers | E. Rogers | British India Line |
| *Black Prince* | 15.3.65 | E. A. Kemp | I. Chadwick, T. Monckton, I. Middleton, B. Walmsley | S. Marchant | Prince Line |
| *Booker Vanguard* | 30.3.65 | S. Armitage | G. E. M. Stevens, G. R. Cowap, A. H. West, R. G. Williams | A. P. Moss | Booker Line |
| *Booker Venture* | 30.9.64 | T. W. Jones | C. C. Morris, E. J. Jones, R. H. Sutton, R. McKechnie | D. A. C. MacRae | Booker Line |
| *Braemar Castle* | 12.3.65 | R. H. Pape | C. C. Burge, P. V. Townsend, G. H. Draysey | R. Cullen | Union Castle Line |
| *Brandon Priory* | 19.1.65 | C. J. Welch | J. Gizowski, M. Harrington, J. Spencer, J. Jordan | W. Sharkey | Warwick Tanker Co. Ltd. |
| *Brasil Star* | 9.11.64 | D. McPhail | D. H. Hulme, F. Hebden, K. Waters, D. W. Ashworth | O. J. O'Shaughnessy | Blue Star Line |
| *Bravo* | 3.12.64 | J. A. Etches | R. W. Barrett, J. A. Pettinger, M. A. Morrill | P. Kenneally | Ellerman's Wilson Line |
| *Brecon Beacon* | 1.3.65 | G. A. Austen | H. E. Carlisle, J. O. James, A. W. Redhead, G. J. Dobell | P. J. Boys | Medomsley S.S. Co. Ltd. |
| *Breconshire* | 8.2.65 | D. D. McIntosh | R. L. Bowyer, C. M. G. Adams, A. E. Longbottom | S. R. McQuire | Glen Line |
| *Brighton* | * | D. Nicholas | M. W. Morrish, R. McKenzie, T. Newton | D. Smith | Chapman & Willan Ltd. |
| *Bristol City* | 8.1.65 | E. Irish | G. D. Snowdon, A. F. Ashton, P. T. Barling | T. M. Jenkins, M.B.E. | Bristol City Line |

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| *British Ambassador* | 10.2.65 | E. Hornby | D. E. Mitchell, R. J. Nener, L. B. Nichols | A. Bateman | B.P. Tanker Co. Ltd. |
| *British Bombardier* | 15.2.65 | P. G. Lowrie | P. M. Hutchinson, A. Phillips, R. T. Chew | | B.P. Tanker Co. Ltd. |
| *British Freedom* | 3.12.64 | C. K. Temple | A. H. Camblin, J. M. Murphy, D. Butler | A. B. Stewart | B.P. Tanker Co. Ltd. |
| *British Resource* | 28.12.64 | A. J. Hole | H. O. McCoy, D. Thomson, J. C. Kennedy, S. J. Knipe | R. MacDonald | B.P. Tanker Co. Ltd. |
| *British Sailor* | 4.3.65 | F. W. Cuffley | A. H. Skellern, R. J. P. Gumbrell, C. G. Young, R. Simpson | J. F. O'Connell | B.P. Tanker Co. Ltd. |
| *British Splendour* | 25.3.65 | R. M. Jary | W. A. Whelpton, A. J. Ward, M. Chambers | L. W. Browne | B.P. Tanker Co. Ltd. |
| *British Strength* | 31.3.65 | G. Symons | M. J. Simpson, P. Harrison, M. E. I. Brown | A. R. A. Ross | B.P. Tanker Co. Ltd. |
| *British Trust* | 19.8.64 | R. E. Bell | C. M. Gilchrist, O. M. Thomas, H. Carruthers | R. Hammond | B.P. Tanker Co. Ltd. |
| *Bulimba* | 28.12.64 | D. C. Murison | W. K. Fullagar, W. A. Herman, E. G. Rowley, G. R. Davidson | J. A. D. Rankine | British India Line |
| *Cairnforth* | 11.11.64 | J. Hogg | W. Orgill, C. Brown, B. Clark | J. F. Kelly | Cairn Line |
| *Cairngowan* | 6.8.64 | I. G. Foster | M. W. Robson, R. Andrews, J. Jackson, F. Sutton | E. Johnston | Cairn Line |
| *Calchas* | 5.1.65 | D. H. Stewart | P. J. Morgan, J. F. Clarkson, P. Dawson | G. D. Yates | A. Holt & Co. |
| *Caledonia* | 1.2.65 | J. L. Gibson, O.B.E. | | | Anchor Line |
| *Caledonia Star* | * | A. H. White | D. Cripps, M. Dunn, T. Black | J. Dunnion | Blue Star Line |
| *Caltex Canberra* | 16.2.65 | N. E. Nute | G. R. Mills, R. Bowler, R. Dion, A. Metcalfe | K. A. Cody | Overseas Tankship (U.K.) Ltd. |
| *Caltex Edinburgh* | 18.2.65 | E. H. Adams | K. R. Appleton, J. Lees, K. E. Maxwell | R. McKechnie | Overseas Tankship (U.K.) Ltd. |
| *Caltex London* | 12.10.64 | R. A. Robinson | A. A. Bolt, J. Davis, B. N. Loane, P. H. Morgan | G. Shaw | Overseas Tankship (U.K.) Ltd. |
| *Caltex Saigon* | 8.5.64 | A. Anderson | W. A. Hursey, P. Hennessey, T. Shields, F. Hosegood | J. Clark | Overseas Tankship (U.K.) Ltd. |
| *Camito* | 4.2.65 | A. Thomson | | | Elders & Fyffes |
| *Cannanore* | 28.10.64 | P. C. Reed | N. F. Corrigall, A. J. Speed, G. F. Smith | R. Brindley | P. & O.-Orient Line |
| *Canopic* | 9.12.64 | B. Hammond | W. E. P. Downing, A. H. Cope | J. Wilson | Shaw Savill Line |
| *Canterbury Star* | 23.3.65 | T. A. Ireland | R. Johnston, C. D. Churcher, D. Wale | G. Arnup | Blue Star Line |
| *Cape Franklin* | 24.3.65 | C. G. Mallett | H. Jackson-Moss, H. S. Taylor, M. J. V. Ricketts, R. Marshall | W. McLeod | Lyle Shipping Co. Ltd. |
| *Cape Howe* | 17.11.64 | A. M. Fraser | G. Mackay, A. G. Brockie, S. Readman, A. Farquahar | B. Breslin | Lyle Shipping Co. Ltd. |
| *Cape Nelson* | 19.2.65 | A. M. Fraser | L. M. Hocking, J. K. Thompson, N. M. MacBeth, N. D. McFallane | W. Rennie, V.C., M.B.E. | Lyle Shipping Co. Ltd. |
| *Cape Sable* | 23.2.65 | D. M. Taylor | D. S. Gordon, D. Cormack, D. A. McI. Sim | J. Woods | Lyle Shipping Co. Ltd. |
| *Capetown Castle* | 21.12.64 | H. L. Holland | D. Murphy, W. Noble, W. Walker, S. Cazalet | J. Eager | Glen Line |
| *Cardiff City* | * | I. Williams | —. Lawson, D. C. Griffiths-Jones, G. Sommer | J. Matthews | Sir Wm. Reardon Smith & Sons |
| *Cardiganshire* | 13.11.64 | S. E. Allerton | I. A. Russell, J. S. Hunter, D. A. Chambers | C. W. Knibb | Glen Line |
| *Carinthia* | 20.10.64 | R. J. N. Nicholas, R.D. | R. Dootson, G. Baggot, D. F. Potter, P. T. Bingley | T. B. Maddrell | Cunard Line |
| *Carmania* | 25.11.63 | W. J. Law, R.D. | C. C. Walker, P. Walton, J. West, M. J. Pratt | C. H. Pennington | Cunard Line |
| *Caronia* | 24.6.64 | W. E. Warwick, R.D. | T. H. L. Boyd, K. D. A. Lamb, W. C. Gardiner, I. Watt | F. Brown | Cunard Line |
| *Carrigan Head* | 9.8.63 | E. G. Davey | H. Thompson, W. Niblock, C. Stewart | R. M. Stirling | Head Line |
| *Caxton* | 14.12.64 | J. G. Wilson | R. H. Anderson, I. C. Rollo, W. D. Lorimer, N. Smith | W. P. M. Edmunds | Transatlantic Carriers Ltd. |
| *Ceramic* | 5.3.65 | N. S. Milne | I. P. Carr, E. Buckle, R. D. Mallam | R. O'Shaugnessy | Shaw Savill Line |
| *Chakla* | 2.11.64 | P. M. Pitcairn | D. M. Ledger, J. M. Rice, P. W. Crisp, J. W. A. Tanner | R. W. Mann | British India Line |
| *Chantala* | 27.10.64 | H. N. Severs | K. W. V. Yeomans, D. Cherry, I. G. F. Harwood | J. Field | British India Line |
| *Cheshire* | 28.12.64 | L. H. Sheldrake | G. F. Dobson, J. F. Beckett, A. L. Bath, R. P. Hornby | J. B. Cave | Bibby Line |
| *Cheviot* | 8.2.65 | J. Conn | D. Maddison, J. E. Davies, G. E. Sandercock | A. B. Rowlands | Bamburgh Shipping Co. Ltd |
| *Chindwara* | 30.3.65 | J. A. McCowan | R. M. Speller, F. McGuire, P. J. Miller, D. I. Armstrong | J. N. Hanly | British India Line |
| *Cilicia* | 26.10.64 | D. Barclay | A. Johnston, P. Strachan, D. Bisset, A. Johnstone | S. Taylor | Anchor Line |
| *City of Birmingham* | 14.12.64 | R. B. May | M. Thorp, T. Mallory, A. Leatherley | D. Herdman | Ellerman Lines |
| *City of Brisbane* | 5.4.61 | W. Kerr | A. J. Evans, B. Butler, D. M. P. Lynch, P. K. Leatham | G. Barlow | Ellerman Lines |
| *City of Brooklyn* | 19.8.64 | R. H. Bellhouse | K. L. Murray, J. Forsyth, C. W. Harvey | E. Vallely | Ellerman Lines |
| *City of Canberra* | * | T. Rigg | K. Muttitt, R. S. Purkiss, J. R. H. Bloss, F. Smith | M. Rigg | Ellerman Lines |
| *City of Chester* | 26.5.64 | D. B. Williams | F. D. McKenna, B. S. Nibbs, D. J. Hazelby | | Ellerman Lines |
| *City of Coventry* | 28.1.65 | P. Redhead | T. Boothman, T. Lee, A. N. Grover, B. Torrance | N. MacDuffie | Ellerman Lines |
| *City of Glasgow* | 21.1.65 | G. E. Greenhow | R. S. Purkiss, A. K. Comrie, G. Johnston | C. B. Smith | Ellerman Lines |
| *City of Johannesburg* | 12.1.65 | J. W. E. Caffyn | E. S. M. Kitching, R. F. Mantle, P. G. Weldon, J. L. Blanch | M. Crocker | Ellerman Lines |
| *City of Khartoum* | 16.11.64 | P. S. Morrison | J. G. Hill, R. M. Ashworth, M. R. Donaghy | | Ellerman Lines |

## Selected Ships (*contd.*)

| Name of Vessel | Last Return Received | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|---|
| *City of Liverpool* | 28.8.64 | F. C. O'Neill | T. J. Frawley, D. D. Turner, R. B. Layton, R. F. Bailey | | Ellerman Lines |
| *City of London* | 17.3.65 | R. W. Tyrrell | T. J. Frawley, D. D. Jamieson, B. W. Noble | W. C. Craig | Ellerman Lines |
| *City of Manchester* | 12.12.62 | T. F. Symons | R. A. Lindsay, J. Waddleton, O. E. Roberts, C. R. Spencer | C. B. Smith | Ellerman Lines |
| *City of Melbourne* | 18.12.63 | J. W. E. Caffyn | C. G. R. Spencer, T. R. M. Lane, A. B. Vaughan | J. M. Balfe | Ellerman Lines |
| *City of New York* | 24.3.64 | R. Bellhouse | P. J. Perham, A. A. Ramsden | R. Coulson | Ellerman Lines |
| *City of Oxford* | 21.10.64 | R. Clark | D. G. Hall, J. M. Bradley, I. Hogg, D. Henderson | R. Lord | Ellerman Lines |
| *City of Pretoria* | 8.3.65 | C. B. Parks Bradbury | I. G. Tew, P. G. Pike, A. G. Hine | J. S. S. MacDonald | Ellerman Lines |
| *City of Swansea* | 4.3.65 | H. Swinney | H. P. Davies, K. Crow, K. Dornan | A. Morris | Ellerman Lines |
| *City of Wellington* | 31.3.65 | H. Lewis | C. W. Rapley, C. Pickering, A. Struthers | G. Wheeler | Ellerman Lines |
| *City of Winchester* | 16.2.65 | J. Ingoldsby | J. F. Blackie, P. Lester, D. C. Butcher | S. Looby | Ellerman Lines |
| *Clan Macdonald* | 25.6.64 | A. Mair | C. MacIver, O. Barnsley, M. Jackson | D. C. J. Laing | Clan Line |
| *Clan Macdougall* | 14.1.65 | T. R. Kendra | P. D. Rushton, M. D. Whiteley, N. D. Creaser | R. F. Cole | Clan Line |
| *Clan Macgillivray* | 12.1.65 | F. H. S. Petherbridge | G. Bligh, J. K. Currie, D. L. Back, H. Blanken | D. A. P. Galbraith | Clan Line |
| *Clan Macgowan* | 30.3.65 | C. M. Powell, M.B.E. | B. M. King, P. C. Byrne, C. Thompson | W. Latus | Clan Line |
| *Clan Macgregor* | 25.9.64 | A. M. Kennedy | R. S. Grant | | Clan Line |
| *Clan Macilwraith* | 15.6.64 | K. C. Simpson | | | Clan Line |
| *Clan Macindoe* | 8.10.64 | L. Pogson | | | Clan Line |
| *Clan Maclean* | 29.3.65 | A. G. Beynon | A. G. Dick, J. J. Ferguson, I. MacAlpine | R. Caine | Clan Line |
| *Clan Maclay* | 28.7.64 | S. R. J. Woods, D.S.C. | B. M. King, R. A. G. Simmonds, D. L. Bark | M. E. Mercer | Clan Line |
| *Clan Macleod* | 17.2.65 | T. H. Graham | R. Beck, J. Howell, D. James | H. Chesters | Clan Line |
| *Clan Macnab* | 10.9.64 | J. W. Charles-Auckland | R. D. Brown | R. Moore | Clan Line |
| *Clan Macnair* | 4.8.64 | J. Browne | A. R. M. White, J. D. W. Chapple, J. R. Jeffrey | J. N. Wright | Clan Line |
| *Clan Mactavish* | 1.12.64 | C. H. A. Thomas | W. O. Dineley, D. Richards, J. W. Costley | P. Entwisle | Clan Line |
| *Clan Sutherland* | 11.2.65 | A. F. Banks | W. Dancer, M. Jackson, G. Stokes, A. Graham | W. Gay | Clan Line |
| *Clan Urquhart* | 9.2.65 | K. C. Simpson | D. R. Wilkin, D. W. Paterson, C. Thomson | D. A. Mackenzie | Clan Line |
| *Colina* | 13.3.64 | W. F. Joyce | D. Naismith, P. Telford, A. G. M. Michie | J. Bailey | Donaldson Line |
| *Corinaldo* | 22.3.65 | S. P. Ewing | W. A. R. Matthew, D. Campbell, A. Hopper | T. S. Stevenson | Donaldson Line |
| *Corinthic* | 26.1.65 | H. O. V. Andersen, M.V.O. | M. C. L. Wilkie, J. F. Mason, R. U. Primrose, A. G. Ewing | H. Polkinghorne | Shaw Savill Line |
| *Cornwall* | 18.1.65 | W. F. T. Dan | I. S. Roberts, H. Harkins, J. L. Hazell, G. F. Everitt | D. Macauley | Federal Line |
| *Cortona* | 13.10.64 | R. Allan | H. D. McDiarmid, J. MacDonald, A. Michie | M. K. Mallory | Donaldson Line |
| *Cotopaxi* | 7.9.64 | J. H. Allenby | J. S. Clapham, J. J. Hurley, B. J. Goodall, W. N. Humphreys | C. R. Ellison | Pacific S.N. Co. Ltd. |
| *Cretic* | 23.3.65 | V. H. Vizer | L. J. Harrison, M. A. Culley, J. W. Neil | E. Cathcart | Shaw Savill Line |
| *Crinan* | 31.3.65 | J. C. Nichol | R. G. Dawson, M. Murray, T. J. O'Connell, B. L. Braithwaite | P. M. Hodgson | J. & J. Denholm Ltd. |
| *Crofter* | 17.11.64 | H. G. Skelly | D. A. Holbert, J. Heppard, M. S. Brooks, T. G. Oxley | J. A. L. MacDonald | Harrison Line |
| *Crystal Bell* | 22.3.65 | K. R. Mackenzie | M. Wareham, R. Uerschuur, J. Hutton, R. Fasson | D. Dawson | Sugar Line |
| *Crystal Crown* | 29.3.65 | R. M. Pitts | D. L. Chant, A. S. Rankin, R. L. Bhattarjee, K. Appleton | M. Hayes | Sugar Line |
| *Crystal Cube* | 8.3.65 | A. F. Lunn | N. C. Horton, F. Bowden, H. H. Scally, G. Spensee | G. Jones | Sugar Line |
| *Crystal Diamond* | * | V. Charles | D. Thompson, A. G. Rex, R. Sprange | N. F. Brennan | Sugar Line |
| *Crystal Gem* | 8.10.64 | R. M. Hall | D. E. Mawhinney, P. Harry, G. Spencer | E. C. Burke | Sugar Line |
| *Crystal Jewel* | 30.11.64 | D. Patrickson | J. T. Merrick, M. J. M. Tyrrell, M. D. Price | F. J. McQuaid | Sugar Line |
| *Crystal Sapphire* | 15.1.65 | S. Gorrell | M. Rushbrook | J. Hearne | Sugar Line |
| *Cumberland* | 26.3.65 | C. P. Robinson | J. E. Jennings, A. J. Ward, R. I. Duce, R. G. Williams | P. A. Lloyd | Federal Line |
| *Cuzco* | 1.6.64 | T. Wilcockson | J. Davie, T. Williams, W. Jenkins, J. Owen | C. McCarthy | Pacific S.N. Co. Ltd. |
| *Cymric* | 26.11.64 | G. V. Conolly, D.S.C. | G. R. Crease, C. R. Downes, M. B. Sandell, W. G. Lockie | J. J. Cameron | Shaw Savill Line |

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| *Dalesman* | 4.1.65 | W. G. Jackson | D. Skillander, N. Nail, P. Herbert, P. McParlin | J. Cooper | Harrison Line |
| *Darro* | 22.9.64 | C. C. Dingle | R. J. L. Greaves, J. H. Escolme, R. G. T. Dabinett | W. G. O'Connell | Royal Mail Lines |
| *Dartwood* | 7.9.64 | J. Elliott | B. Simmons, J. H. Kelly, B. L. Bass | M. Lebbon | Wm. France, Fenwick & Co. Ltd. |
| *Debrett* | 29.7.64 | E. D. Spooner | J. J. Barrowcliff, R. R. Grimer, M. Cawood | M. F. Hayes | Lamport & Holt Line |
| *Delphic* | 1.12.64 | R. O. Guille | R. W. Pedlow, J. M. Estill, M. Sargeant, M. Murray | J. F. Twomey | Shaw Savill Line |
| *Denbighshire* | 5.3.65 | C. R. B. Goodman, M.B.E. | B. Tang, J. Turner, P. A. Brown | B. J. Potter | Glen Line |
| *Deseado* | 8.3.65 | J. Fox | D. K. Allin, R. P. Harris, T. V. Whittaker, G. B. Panes | J. Cullen | Royal Mail Lines |
| *Devis* | 3.7.64 | J. I. Jones | B. Mann, M. P. Roberts | | Blue Star Line |
| *Devon* | 7.10.64 | I. C. Davison | T. Hughes, D. Davies, B. Baggott, J. Gill | K. Dougall | Federal Line |
| *Devon City* | 5.3.65 | A. B. Parkhouse | D. B. Wootton, T. H. White, A. Hollidge | G. T. Walker | Sir Wm. Reardon Smith & Sons |
| *Devonia* | 31.8.64 | B. A. Rogers, O.B.E., D.S.C., R.D. | P. R. White, G. A. Thornton, M. J. Wray | R. Berry | British India Line |
| *Diomed* | 30.11.64 | W. T. D. McMillan | P. G. Taylor, D. Hamilton, P. Lloyd-Jones | R. B. Paley | A. Holt & Co. |
| *Discovery* | 1.10.64 | R. H. A. Davies | G. L. Swanson, A. R. Ashby, P. J. C. Roberts | D. Mossey | National Institute of Oceanography |
| *Donegal* | 8.2.65 | E. J. Ridout | H. Goulden, J. Pierce, W. Gent | J. Watson | Trinder Anderson & Co. |
| *Dorset* | 31.3.65 | C. A. Miller | M. G. Bishop, J. Gibbard, J. W. Gill, A. C. Anson | M. E. McEwen | Federal Line |
| *Drina* | 22.2.65 | G. A. Gibbons | P. L. Morley, C. L. Earl, W. Strevens | N. Morrow | Royal Mail Lines |
| *Dukesgarth* | 15.3.65 | N. Richardson | J. Fox, J. P. Wood, J. Player, B. Cowley | J. Grant | Wm. Cory & Son Ltd. |
| *Dunedin Star* | 10.3.65 | R. H. Stark | P. C. Nicholls, R. Cameron, P. A. M. Keenan | W. R. MacDonald | Blue Star Line |
| *Dunera* | 2.11.64 | R. Baker | R. Beedel, M. J. Heasman, W. Leech | W. C. G. Sturgess | British India Line |
| *Durango* | 15.4.64 | J. A. Phillips | P. J. C. Smith, V. F. R. Moorman | C. E. Jones | Royal Mail Lines |
| *Durham* | 29.7.64 | J. D. Guyler | M. J. Mann, D. Watt, B. Hogarth | D. L. Byne | New Zealand Shipping Co. Ltd. |
| *Eden* | 25.2.65 | C. D. Ratcliff | K. A. Hart, T. Casey, P. J. Boucher | J. Duignan | Royal Mail Lines |
| *Edenmore* | 11.1.65 | L. W. Cooper, O.B.E. | L. P. Lambourne, P. Bennison, J. Rutherford, D. J. Cole | P. Dunne | Furness Lines |
| *Edinburgh Castle* | 15.3.65 | W. S. Byles, R.D. | D. Russell, R. Bryans, P. McMillan, D. P. Cousins | J. H. Summers | Union Castle Line |
| *Edward Wilshaw* | 18.1.65 | A. Tudor | G. J. N. Thomms, J. Hawkins, I. Williams, R. S. Merritt | D. T. Miles | Cable & Wireless Ltd. |
| *Egton* | 9.10.64 | J. S. Pinkney, O.B.E. | G. Stenhouse, A. Ferguson, E. Kinnaird, S. Jackson | A. N. Marsden | Rolands & Marwood |
| *Elmbank* | 6.11.64 | E. J. Ray | | | Bank Line |
| *Empire Star* | 13.1.65 | G. T. King | J. M'Neill, C. I. MacKillop A. P. Leason | L. Glanton | Lamport & Holt Line |
| *Empress of Canada* | 24.3.64 | W. S. W. Main | G. Cotton, G. Colclough, D. Burt, T. Parker | P. B. McNab | Canadian Pacific Line |
| *Empress of England* | 11.2.65 | F. W. S. Roberts, R.D. | A. L. Morris, T. Parker, P. Adair, G. Sayle | W. Maudsley | Canadian Pacific Line |
| *English Star* | 29.3.65 | E. C. Laidlaw | M. S. Linekar, D. Rogers, J. McMath, M. McDowell | F. Devlin | Blue Star Line |
| *Ernest Holt* | 18.2.63 | E. A. Binnington | | | Ministry of Agriculture, Fisheries and Food |
| *Essequibo* | 30.7.64 | R. Phillips | | | Royal Mail Lines |
| *Essex* | 7.1.65 | S. G. Robinson, M.B.E. | A. R. Taylor, B. C. Dennis, E. G. Cunnah | E. H. Perry | Federal Line |
| *Esso Cambridge* | 18.12.64 | R. E. Smith | M. Brisley, S. Q. Bean, E. Taylor | J. Miller | Esso Petroleum Co. Ltd. |
| *Esso Canterbury* | 19.10.64 | H. Jones | H. N. McQuaid, A. Asher, B. Lee, C. Harbinson | G. Hudson | Esso Petroleum Co. Ltd. |
| *Esso Exeter* | 2.2.65 | E. W. Thomas | J. Humphries, G. Harvey, B. J. Clark | A. Brown | Esso Petroleum Co. Ltd. |
| *Esso Hampshire* | 5.1.65 | L. J. Dance | M. Birchmore, P. O'Connor, F. M. Lord | L. Phillips | Esso Petroleum Co. Ltd. |
| *Esso Pembrokeshire* | 18.2.65 | W. MacDonald | G. T. Rymer, J. G. Bean, E. Brines, —. Lees | J. Sommerville | Esso Petroleum Co. Ltd. |
| *Esso Warwickshire* | 9.11.64 | T. R. Agnew | D. M. Pope, T. Jemison, M. King, J. Berryman | P. Cagney | Esso Petroleum Co. Ltd. |
| *Esso York* | 15.9.64 | A. C. Alexander | O. T. Williams, R. G. Morrison, W. McCormick | P. Kilbane | Esso Petroleum Co. Ltd. |
| *Explorer* (F.R.S.) | 15.2.65 | E. A. Bruce, O.B.E. | A. A. Baxter, J. Steven, J. Craig, W. Gatt | J. Steven | Dept. of Agriculture & Fisheries for Scotland |
| *Explorer* (m.v.) | 17.9.64 | A. Sutherland | R. J. Smith, R. E. Jones, L. G. Knock | D. Wright | Harrison Line |
| *Farsistan* | 28.1.65 | R. Connacher | A. W. Jones, A. M. J. Jenkins, C. Bush | K. Burnitt | Strick Line |
| *Fidra* | 17.2.65 | W. P. Watt | D. Skinner, J. B. Somerville, C. Begg | | Chr. Salvesen & Co. Ltd. |
| *Firbank* | 26.1.65 | J. M. Mackenzie | R. A. Bazire, A. J. Gillespie, J. MacKenzie | K. O'Doherty | Bank Line |
| *Flamenco* | 29.3.65 | A. S. MacLean | E. G. Bowyer, G. Dewsnap, S. F. J. D'Arcy | J. Hitchen | Pacific S.N. Co. Ltd. |
| *Flintshire* | 22.3.65 | G. Edge, O.B.E. | B. Milkins, R. A. Mason, D. Belk | W. W. Beebee | Glen Line |
| *Forthfield* | 25.1.65 | W. H. R. Pugsley | D. Clegg, D. Wilson, J. G. L. Abuelo, W. E. G. Barnes | J. Hanna | Hunting & Son Ltd. |
| *Franconia* | 28.10.64 | H. L. de Legh, R.D. | J. T. West, P. R. Carling | W. Long | Cunard Line |
| *Fred Everard* | 17.9.64 | W. G. Hunt | J. P. Skinner, J. Mallam, J. Talbot, J. London | | F. T. Everard & Sons Ltd. |
| *Frederick T. Everard* | 17.8.64 | G. Brown | | | F. T. Everard & Sons Ltd. |
| *Galway* | 4.11.64 | R. J. Ogilvy | R. H. Wyatt, W. M. Cowan | D. M. Watson | Trinder Anderson & Co. |

## Selected Ships (*contd.*)

| Name of Vessel | Last Return Received | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|---|
| *Geestbay* | 19.2.65 | D. G. Powell | K. H. Waters, L. Newman, O. Springett, J. Milner | A. Cochrane | Geest Industries Ltd. |
| *Geestport* | • | P. W. Groves | B. Lee, G. De F. Foster, D. Boon | J. Conway | Geest Industries Ltd. |
| *Georgina V. Everard* | 18.3.65 | L. A. Anderson | K. M. Thein, K. Hamm, A. Mayson | W. Arscott | F. T. Everard & Sons Ltd. |
| *Glanely* | 22.2.65 | F. J. Johns | | | W. J. Tatem Ltd. |
| *Glenartney* | 13.1.65 | R. G. Rippon | D. M. Richards, A. Williamson, C. I. Cunningham, H. Z. Husni | H. N. Kinley | Glen Line |
| *Glenearn* | 16.12.64 | F. N. Curphey | N. R. Moon, G. Wood, J. McA. Irvine | R. J. Leppard | Glen Line |
| *Glenfalloch* | 28.12.64 | T. R. Walker | D. G. T. Greenhalgh, T. Main, H. Davies | T. Waddington | Glen Line |
| *Glengarry* | 11.2.65 | N. Willis | R. A. Facey, B. Cushman, P. J. Purves | A. K. Dickens | Glen Line |
| *Glengyle* | 13.1.65 | J. K. Edmonds | R. L. Flinders, G. P. Home, J. Barlow | E. Barnfather | Glen Line |
| *Glenlyon* | 24.2.65 | W. K. Hole | J. P. A. Clarke, P. F. Robinson, R. H. C. Cunnington | P. T. A. Roberts | Glen Line |
| *Glenmoor* | 22.3.65 | F. Bradfield | H. I'Anson, G. W. Richardson | L. J. Rowe | Moor Line |
| *Glenogle* | 22.1.65 | W. J. Moore, D.S.C., R.D. | R. J. M. Hogg, A. J. Dyne, P. Surfleet | A. Moloney | Glen Line |
| *Glenorchy* | 16.3.65 | H. S. Taylor | G. J. Sives, J. M. Wilson, A. A. MacKenzie | A. Brown | Glen Line |
| *Glenpark* | 8.3.65 | H. W. MacDonald | E. McEwen, G. Morton, D. M. Wohlgemuth | M. G. Luland | Glen Line |
| *Glenroy* | 9.12.64 | I. R. Atkinson | J. S. Harrington, J. M. Dick, J. Geddie, P. Grant | C. Branthwaite | Glen Line |
| *Gloucester* | 23.9.64 | J. D. Hellings | C. S. Baugh, T. Wright, R. Setchell, T. Gibson | W. Davenport | Federal Line |
| *Gloucester City* | 20.11.64 | D. A. Braid | D. F. Williams, D. G. H. Smith | H. Roderick | Bristol City Line |
| *Gloucestershire* | 1.7.64 | P. Saunders | C. R. Tiller, D. I. Jones, C. R. Driver | R. A. Waller | Bibby Line |
| *Golfito* | 10.2.65 | W. F. Young | T. A. Inglis, R. D. Fell, C. Heard, J. W. S. Dunn | G. Sutherland | Elders & Fyffes |
| *Gothic* | 3.12.64 | G. Campbell | M. A. Hooper, C. C. Paterson, J. D. Howie, H. R. Green | B. McGovern | Shaw Savill Line |
| *Gothland* | 31.12.64 | J. M. Laing | G. Hogg, H. Cole, R. G. Dickson, D. Christie | M. King | Currie Line Ltd. |
| *Governor* | 1.2.65 | W. E. Hinde | J. A. Fletcher, W. Donaldson, L. B. Wilkock | J. Barnie | Harrison Line |
| *Graigfelen* | • | K. M. Jordan | N. MacDonald, R. Rotie, M. Manning | | Graig Shipping Co. Ltd. |
| *Halifax City* | 15.3.65 | W. Stoodley | A. Johansen | M. LeMarche | Bristol City Line |
| *Haparangi* | 10.7.64 | W. Stevens | P. Henderson, P. Wheeler, R. Young | A. Holmes | New Zealand Shipping Co. Ltd. |
| *Hauraki* | 19.10.64 | E. F. H. Allen | P. R. Pigneguy, P. Tiley, J. Rutherford, J. D. Thomson | D. R. Lake | New Zealand Shipping Co. Ltd. |
| *Hazelmoor* | 7.1.65 | W. A. Watson | J. C. Priest, A. W. Fielding, A. Rayner | A. H. G. Wall | Moor Line |
| *Hector* | 16.2.65 | S. S. Howie | M. E. G. Leale, A. D. Denham, J. Hughes | W. Phillips | A. Holt & Co. |
| *Hector Heron* | 14.11.63 | S. K. Williams | P. A. J. Bowes, W. R. Ward, B. B. King, R. K. Wilson | J. L. Lamb | Hector Whaling Ltd. |
| *Helenus* | 28.1.65 | C. T. Collett | D. J. Gallagher, S. Barnes, P. Wallace | R. J. Hinchliffe | A. Holt & Co. |
| *Helisoma* | • | C. Close | D. Pringle, T. M. Logan | | Shell Tankers (U.K.) Ltd. |
| *Hemimactra* | • | P. S. Shares | D. Spence, B. Bowtell, P. C. Koops, S. D. Mayl | J. P. O'Shea | Shell Tankers (U.K.) Ltd. |
| *Herefordshire* | 1.1.64 | A. N. Williamson | A. Warre-Dymond, A. Hudson, D. R. Clayton | E. Unsworth | Bibby Line |
| *Hertford* | 20.1.65 | H. C. R. Dell | P. H. Milburn, S. N. A. Wells, P. Grimes, J. H. Agnew | H. Larkin | Federal Line |
| *Himalaya* | 4.2.65 | P. G. Lawrence | —. Cutmore, —. Napier, J. Hanbidge, W. D. M. Williamson | T. H. Martin | P. & O.-Orient Line |
| *Hinakura* | 13.1.65 | N. L. Warren | J. M. Luxton, P. Clegg, C. Greenwood, K. Mulgrew | K. D. Wilson | New Zealand Shipping Co. Ltd. |
| *Hinea* | • | —. Bowlerwell | G. E. D. Aberdeen, P. Simpson, J. Lakeman | D. Forbes | Shell Tankers (U.K.) Ltd. |
| *Horomya* | 29.3.65 | R. Thomson | D. Hodson, P. Liddell, B. Cork, J. Stuart | H. Broad | Shell Tankers (U.K.) Ltd. |
| *Hororata* | 9.12.64 | J. Weston | A. Allen, B. Austen-Smith, P. Hornby, C. R. H. Vicary | S. J. Braithwaite | New Zealand Shipping Co. Ltd. |
| *Humilaria* | 2.2.65 | G. Turnbull | M. D. H. Hardy, B. E. Alfred, J. L. Taylor | J. MacAlister | Shell Tankers (U.K.) Ltd. |
| *Huntingdon* | 26.3.64 | T. Alderman | D. R. J. Plimsaul, D. H. Lovering, A. S. Jackson, J. Hazell | E. Pooley | Federal Line |
| *Hurunui* | 6.11.64 | S. W. Andrews | J. B. Hill, F. Lafferty, C. Whale | J. Hollands | New Zealand Shipping Co. Ltd. |
| *Iberic* | 6.10.64 | J. Gunning | C. Sharp, F. Irons, J. N. Ormerod | R. L. Baker | Shaw Savill Line |
| *Illyric* | 18.12.64 | R. G. James, R.D. | C. T. Dampier, J. S. Hines, S. R. Pinney, A. H. Thompson | H. Preen | Shaw Savill Line |
| *Imperial Star* | 1.2.65 | G. L. Evans, O.B.E. | P. E. Long, L. Kingsbury, C. Jones | C. F. Frost | Blue Star Line |

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|---|---|---|---|---|
| *Inverbank* | 3.2.65 | G. D. Scott | F. Saunders, J. T. Jenkins, H. Wright | M. N. Coulter — Bank Line |
| *Inverewe* | 16.12.64 | J. J. Rose | L. A. Marriott, K. Inglis, C. P. W. White | B. Singleton — J. & J. Denholm Ltd. |
| *Ionic* | 13.1.65 | R. G. E. Grant | E. R. Snow, R. C. O'Neill, S. L. Horscroft, A. P. W. Peacock | L. D. Waterhouse — Shaw Savill Line |
| *Iron Age* | 5.2.65 | G. Black | J. W. McLean, J. R. Tissiman, H. Nish, D. Fraser | J. Gargan — Common Bros. Ltd. |
| *Iron Barque* | 1.3.65 | D. H. Flett | J. R. Keedy | A. Wilson — Common Bros. Ltd. |
| *Iron Crown* | 25.1.65 | R. G. McKay | | Common Bros. Ltd. |
| *Ivernia* | 5.2.65 | D. H. Shimmin | A. Dunster | Cunard Line |
| *Ixion* | 28.9.64 | F. N. Fisher | R. H. Smith, M. Morgan, A. Gregg | S. R. McQuire — A. Holt & Co. |
| *Jamaica Planter* | 7.12.64 | G. E. M. Jenkins | C. Simons, E. Lisk, S. Eunson | J. E. Conway — Kaye Son & Co. Ltd. |
| *Jamaica Producer* | 17.3.65 | T. A. Kidd | R. W. Warwick, B. Thompson, A. Hutton | K. Mugridge — Kaye Son & Co. Ltd. |
| *Jason* | 2.11.64 | H. S. Clarke, M.B.E., D.S.C. | H. P. Simmons, J. G. Thoburn, J. L. Peterson, J. E. McGregor | B. J. Potter — A. Holt & Co. |
| *John Biscoe* | 29.5.64 | W. Johnston | A. B. Joubert, R. N. Cumbers, T. Woodfield | A. Quinn — British Antarctic Survey |
| *Kenilworth Castle* | 28.1.65 | A. T. Underdown | S. J. Ivey, E. T. Burke, J. M. Smoult | W. R. Scobie — Union Castle Line |
| *Kenuta* | 17.1.64 | R. K. C. Thomas | P. T. McGonigal, B. Goodall, W. J. Turner, D. J. Good | R. Roberts — Pacific S.N. Co. Ltd. |
| *Kenya* | 25.11.64 | I. K. Bowerman | A. St. J. C. Gates, J. W. Farquharson, N. Hocking | J. D. Masterman — British India Line |
| *King Arthur* | 12.1.65 | G. B. Craig | M. J. Allen, A. R. M. White, J. Macauley | D. Waugh — King Line |
| *King City* | 22.2.65 | C. E. Exton | J. J. Birrell, A. C. T. Thomas, M. Sullivan | C. Ryder — Sir Wm. Reardon Smith & Sons |
| *Kinnaird Castle* | • | J. C. Smith | C. Hoskins, J. Apsey | G. Hudd — Union Castle Line |
| *Kinpurnie Castle* | 12.1.65 | H. D. T. Lockyer | I. B. Dale, J. S. Catterall, W. F. Sutherland | D. Norris — Union Castle Line |
| *Kohistan* | 3.2.65 | E. C. Thompson | D. E. Walshe, N. Peckham, J. Frost | W. Gordon — Strick Line |
| *Koyan* | 7.1.65 | M. Fair | —. Flitch, G. Boyle, J. Binnie | D. O'Shea — Henderson Line |
| *Laganbank* | 29.3.65 | J. B. Mitchell | R. S. Lynch, A. M. MacNab, P. Moore, R. Millen | R. C. Hayward — Bank Line |
| *Laksa* | 15.3.65 | D. I. Polson | A. Hamill | P. Telfer — Chr. Salvesen & Co. Ltd. |
| *Lancashire* | 22.2.65 | N. F. Fitch, M.B.E. | C. J. Willard, M. J. Horn | W. J. Ferry — Bibby Line |
| *Laurentia* | 17.11.64 | T. S. Graham | F. C. Nicol, A. McGugan, P. G. Edgar | D. Murray — Donaldson Line |
| *Leeds City* | • | J. H. Thornhill | C. MacIvor, J. Thomas, L. Best | J. Matthews — Sir Wm. Reardon Smith & Sons |
| *Limerick* | 9.12.64 | T. Hastings | D. Rooke, A. LeMay, N. Luck | D. Finlayson — Trinder Anderson & Co. |
| *Lindisfarne* | 28.1.65 | G. Robinson | K. Sarkar, D. Maddison, F. E. Torgersen, B. G. Longley | P. Flanagan — W. A. Souter & Co. Ltd. |
| *Linkmoor* | 22.3.65 | T. R. Rowe | R. B. Crosby, T. Hall, A. N. Watson | D. C. Keith — Moor Line |
| *Lismoria* | 21.12.64 | J. L. Downie | R. Muir, N. Dalziel, J. Kane | I. Humphreys — Donaldson Line |
| *Livorno* | 3.11.64 | W. Walker | P. J. S. Bishop, J. Turley, R. Ward | W. Walsh — Ellerman's Wilson Line |
| *Loch Avon* | 26.6.64 | G. Chatterley | P. Griffin, A. McGreagor, C. Dane | —. Blane — Royal Mail Lines |
| *Loch Garth* | 11.8.64 | G. C. W. Meldrum | R. Little, E. Edwards, V. Moorman, G. Foxton | F. E. Page, M.B.E. — Royal Mail Lines |
| *Loch Gowan* | 10.11.64 | C. C. Dingle | B. Lewarn, R. Oliphant, B. Kidwell, P. Troy | M. Harriman — Royal Mail Lines |
| *Loch Loyal* | 22.5.64 | W. A. Kennedy | A. W. E. Norman, P. Troy, P. Morley | D. McMillan — Royal Mail Lines |
| *London Pride* | 24.2.64 | A. Armstrong | I. P. Skipp, O. Connor, R. Sutherland, B. Robson | M. Hooks — London & Overseas Freighters Ltd. |
| *Longstone* | 17.12.64 | P. L. Johnson | R. J. Carney, R. J. Charlton, G. B. Bagnall | J. F. Morris — W. A. Souter & Co. Ltd. |
| *Mabel Warwick* | 2.3.65 | A. J. Bulley | P. J. Healey, M. Waterton, P. T. Bean, M. Tulloch | R. Davies — Houlder Line |
| *Magdapur* | 1.5.64 | S. E. Turner | R. H. Newton, R. Roberts, F. A. Brown | B. A. Gaston — Brocklebank Line |
| *Mahanada* | 16.9.63 | I. A. MacLaren | J. R. Dovell, D. M. G. Murphy | J. K. Foster — Brocklebank Line |
| *Mahout* | 26.2.65 | G. A. Jackson, M.B.E. | D. F. W. Stone, D. A. Cosker, A. MacVean | D. H. Butterworth — Brocklebank Line |
| *Mahseer* | 10.4.64 | O. Pritchard | J. C. Stanley, E. Besson, D. C. Matthews, P. Slade | H. Jefferson — Brocklebank Line |
| *Makrana* | 14.12.64 | P. D. McKenzie | D. R. Newland, G. D. Symonds, R. S. Master, P. A. Fraser | A. J. Dunn — Brocklebank Line |
| *Manchester City* | 4.5.64 | J. M. Rushworth | J. Chapman, A. Tester, G. Hannaford, J. Bell | P. A. Byrne — Manchester Liners |
| *Manchester Commerce* | 1.5.64 | A. Starmer | D. R. Perry, D. R. Nutton, J. S. Watson, A. C. Tester | Manchester Liners |
| *Manchester Faith* | 16.11.64 | D. G. Thomas | D. J. Howarth, J. Baker, R. Wood | J. J. Walsh — Manchester Liners |
| *Manchester Fame* | 3.12.64 | P. N. Fielding | F. N. Briggs, D. D. Barlow, J. H. Kirkham, A. S. Bashford | F. Berry — Manchester Liners |
| *Manchester Mariner* | 6.5.64 | J. Rushworth | D. Martin, C. Spence, G. Evans, J. Kirkham | J. Buchanan — Manchester Liners |
| *Manchester Merchant* | 26.2.65 | G. R. Thompson | J. H. Cryer, D. P. Humphrey, K. Simpson | B. E. Bewley — Manchester Liners |
| *Manchester Miller* | 24.2.64 | E. W. Espley | L. Clark, N. W. Cockshoot, D. Gregson, J. Illingworth | E. Heywood — Manchester Liners |
| *Manchester Progress* | 1.3.65 | J. E. Askew | S. J. Owen, J. A. McKay, L. Clark, G. B. Hannaford | K. M. Smith — Manchester Liners |
| *Manchester Regiment* | 30.3.65 | A. Cookson | A. Milroy, D. W. Whitworth, D. Martin, T. Mitchell | T. Berry — Manchester Liners |

## Selected Ships (*contd.*)

| Name of Vessel | Last Return Received | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|---|
| *Manchester Renown* | * | W. E. G. Oliver | T. Mitchell, C. Spence, G. Hannaford | K. Lancashire | Manchester Liners |
| *Manchester Shipper* | 3.2.65 | D. S. Millard | W. R. Donaldson, D. P. Humphrey, R. Wood, J. M. Rimmer | B. Long | Manchester Liners |
| *Manchester Spinner* | 3.2.64 | W. Hine | I. Borrowdale, A. Rowlands, J. A. McKay | J. Reid | Manchester Liners |
| *Manchester Trader* | 8.2.65 | J. R. Stephens | M. I. Browen, J. Gray, A. Tilmouth | I. T. Strachan | Manchester Liners |
| *Manipur* | 30.12.64 | C. W. Gray | J. D. Smyth | | Brocklebank Line |
| *Marabank* | 4.3.65 | A. J. Kiff | | J. H. Edwards | Bank Line |
| *Marengo* | 20.8.64 | F. Barnes | M. Chinn, M. Salsbury, T. Fugill | D. Foers | Ellerman's Wilson Line |
| *Maron* | 11.2.65 | A. R. Davidson | I. D. Farrell, R. H. L. Henry, P. P. Taylor, I. B. Thomson | E. H. Whitelegg | A. Holt & Co. |
| *Matina* | 8.3.65 | G. C. Wallis | H. B. Gordon, C. A. Hare, J. Wright | D. Brown | Elders & Fyffes Ltd. |
| *Mauretania* | 13.1.65 | J. Treasure Jones, R.D. | H. L. Smith, C. C. Walker, A. P. Thomas, D. M. Henderson | E. L. Boyce | Cunard Line |
| *Media* | 21.12.64 | R. O. Venn | E. G. Marshall, G. Buckley, D. F. McManus, J. Ford | R. A. Hutchison | Cunard Line |
| *Melbourne Star* | 28.12.64 | G. J. R. Bowden | M. E. Holland | J. Evans | Blue Star Line |
| *Mercury* | 11.5.64 | G. H. C. Reynolds | D. J. Hider, K. M. Humphrey, W. Venables, D. MacFarlane | J. Otley | Cable & Wireless Ltd. |
| *Middlesex* | 28.1.65 | R. E. Baker | P. J. Zealley, H. C. Hynard, A. R. Savill, P. D. H. Richards | R. G. Heath | Federal Line |
| *Monarch* | 22.9.64 | O. R. Bates | | | H.M. Postmaster General |
| *Montreal City* | 31.12.64 | E. V. Mace | G. Chawner, A. Burton, A. Johnson, M. Winter | C. Wilkin | Bristol City Line |
| *Muristan* | 5.2.65 | H. Gilchrist | G. Noblet, M. Doyle, D. M. Foster, R. Ling | S. Belshaw | Strick Line |
| *Neleus* | * | D. K. Dunlop | P. J. Morgan, E. Watterson, —. Sharpe | J. Nolan | A. Holt & Co. |
| *Nestor* | 31.8.64 | D. R. Hayward | B. G. Ball, R. Smith, J. Gordon | A. Greville | A. Holt & Co. |
| *Newfoundland* | * | J. T. Sheffield, R.D. | J. H. Smith, N. R. Land, E. M. Bowen | M. O'Shea | Furness Lines |
| *Newcastle Star* | 10.3.65 | J. S. M. Hunter | P. J. H. Cannell, J. B. Shanley, N. J. Munro | V. G. Clark | Blue Star Line |
| *New York City* | 24.3.65 | F. W. Harris, R.D. | D. G. H. Smith, P. J. Wright, C. M. Lawton, D. Simpson | J. T. W. Moody | Bristol City Line |
| *New Zealand Star* | 10.12.64 | G. G. Waddell | K. Kilmartin, D. Tipping, R. Farley | T. Morrison | Booth Line |
| *Northern Star* | 26.1.65 | L. H. Edmeads | G. Stewart, M. Coglan, G. Baker | C. Carpenter | Shaw Savill Line |
| *Northumberland* | 26.1.65 | S. W. Lambrick | E. M. Smith, J. S. Thorpe, D. C. Butcher, J. R. Ayers | B. L. Cullimore | Federal Line |
| *Nottingham* | 16.2.65 | A. B. Stalker | W. Killackey, M. Hawkins, D. Huston, A. Robinson | S. Edwards | Shaw Savill Line |
| *Obuasi* | 11.3.65 | F. Robinson | G. M. Timms, W. Jamison, A. Rae, D. Turner | M. S. McLaren | Elder Dempster Lines |
| *Ocean Monarch* | * | R. Marshall | R. B. Dickson, T. Avens, P. Miller | J. Hynes | Furness Lines |
| *Orcades* | 29.3.65 | E. G. H. Riddelsdell, R.D. | J. R. Wilson, P. Quinn-Young, M. P. Reed | R. C. Crompton | P. & O.-Orient Line |
| *Oronsay* | 8.1.65 | R. J. Brittain | L. J. Morrow, N. I. Collett, G. B. Robinson, M. J. Scanlan | J. B. French | P. & O.-Orient Line |
| *Orsova* | 1.2.65 | R. J. Craddock, O.B.E. | C. F. L. C. Evans, C. R. P. Campbell, W. J. Thompson | P. Parish | P. & O.-Orient Line |
| *Otaio* | 2.2.65 | K. Barnett, R.D. | R. H. Thompson, R. Michael, E. B. Daubeny, A. Marshall | L. H. Sutton | New Zealand Shipping Co. Ltd. |
| *Otaki* | 13.10.64 | C. A. Miller | W. Marshall, R. A. Laycock, B. K. Peace | R. F. McManamon | New Zealand Shipping Co. Ltd. |
| *Otra* | 8.2.65 | W. S. Sinclair | J. W. T. Low, T. Lawrence | | Chr. Salvesen & Co. Ltd. |
| *Pacific Envoy* | 11.2.65 | A. H. Cooke | C. E. Nicholls, D. A. Whitaker, R. A. V. de Garis | J. MacG. Shand | Furness Lines |
| *Pacific Northwest* | 12.3.65 | J. L. Sims | P. E. Hammond, M. Baker, C. G. Mathias, D. Anderton | P. J. McKeon | Furness Lines |
| *Pacific Reliance* | 8.10.64 | C. G. Killick | L. J. Stephenson, B. Norton, A. Hardy, T. J. Avens | A. E. Fell | Furness Lines |
| *Pacific Stronghold* | 21.1.65 | G. Brown | P. R. Savage, F. B. Moore, A. B. Woodley | J. N. MacKay | Furness Lines |
| *Papanui* | 16.2.65 | J. M. Burn | G. B. Johnson, R. T. MacNamara, K. Mills, P. Robertson | D. C. B. Hepburn | New Zealand Shipping Co. Ltd. |
| *Paparoa* | 17.3.65 | J. A. North | P. R. Simpson, H. G. Williams, P. Storm, M. W. Carrell | R. A. Laycock | New Zealand Shipping Co. Ltd. |
| *Parthia* | 19.5.64 | E. A. Irvine | B. G. Gouldthorpe | A. Turner | Cunard Line |
| *Pegu* | 8.10.64 | K. S. Marsh | F. Bullen, W. Chambers, D. Lucey, R. French | J. H. Brown | Henderson Line |

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| *Pendennis Castle* | 31.12.64 | R. A. D. Cambridge, D.S.C.,R.D. | D. J. Brunskill, J. Simpson, A. Wright, M. I. Bell | P. P. Williams | Union Castle Line |
| *Pennyworth* | 21.12.64 | I. Gault | | | R. S. Dalgliesh Ltd. |
| *Perim* | 7.12.64 | M. H. Haggas | A. E. Plews, R. G. Lyon, H. A. Wessom | N. Bagent | P. & O.-Orient Line |
| *Perseus* | 1.3.65 | S. C. Llewellyn | D. J. Metcalf, H. T. Reid, R. Telfer | D. Gunning | A. Holt & Co. |
| *Persic* | 17.2.65 | G. W. Houchen, O.B.E., R.D. | I. Sayward, J. Kluka, R. Atkinson | B. Hopkins | Shaw Savill Line |
| *Photinia* | • | R. J. Freeman | J. W. Spence, W. H. Seekirk, J. B. Barker | K. T. Jones | Stag Line Ltd. |
| *Piako* | 16.11.64 | D. E. Moran | M. J. Player, G. C. Stalker, J. U. Nunnerly | A. M. Page | New Zealand Shipping Co. Ltd. |
| *Pipiriki* | 31.3.65 | A. W. S. Cripps | D. Grimes, J. R. Collins, B. J. Prince, K. B. Lowery | J. Y. Diggle | New Zealand Shipping Co. Ltd. |
| *Pizarro* | 22.3.65 | A. Lang | A. M. Shaw, R. Davies, P. Chadwick, A. S. Adams | J. Newman | Pacific S.N. Co. Ltd. |
| *Port Adelaide* | 7.8.64 | E. J. H. Arnold | M. Baker, G. Rosie, M. Jarvis | C. Hill | Port Line |
| *Port Auckland* | 27.10.64 | F. J. Lavers | M. G. Smithson, R. G. Burnet, C. H. Boyd, P. J. Henley | H. Horrocks | Port Line |
| *Port Brisbane* | 28.12.64 | V. G. Battle | R. G. Howell, J. D. Cartmell, J. Myers | H. G. Percival | Port Line |
| *Port Hobart* | 10.3.65 | J. S. Moate | J. L. Robertson, E. J. Coolen, P. E. Lucock | B. E. Finders | Port Line |
| *Port Invercargill* | 5.2.65 | P. E. Packwood | D. L. B. Marriott, D. Stewart-Taylor, R. H. Givan | M. M. Garrett | Port Line |
| *Port Jackson* | 16.11.64 | W. J. Williams | P. J. F. Bush, C. H. P. Brown, D. D. Taylor | | Port Line |
| *Port Launceston* | 13.11.64 | A. J. Hawkins | J. H. Pring, M. P. Luce, A. A. MacKellar | J. M. Brogden | Port Line |
| *Port Lincoln* | 29.6.64 | V. A. Hunt | J. E. Crowsley, H. T. Channon, P. J. Hayman | C. Hall | Port Line |
| *Port Lyttelton* | 29.7.64 | A. W. Kensett | D. H. Paskins, R. Mitchell, T. Balfour | D. Uglow | Port Line |
| *Port Macquarie* | 29.3.65 | V. A. Hunt | J. E. Clarke, R. K. Sturge, D. N. Ford | L. G. Cuthbert | Port Line |
| *Port Napier* | 22.1.65 | A. S. McClounan | R. L. Jones, D. J. Campbell, P. D. James | T. Hargrave | Port Line |
| *Port Nelson* | 22.5.64 | G. Carling | P. A. Bates, M. S. Polson, P. E. Lucock | W. C. Cumming | Port Line |
| *Port Nicholson* | 3.3.65 | E. W. R. Young | J. H. Corse, J. A. Oscroft, G. W. Hay | A. McFaul | Port Line |
| *Port Phillip* | 28.12.64 | J. G. A. Dunn | J. C. Hopkin, L. G. Williamson, B. F. Medcroft | D. Scholefield | Port Line |
| *Port Pirie* | 30.10.64 | H. B. Conway | R. E. D. Clifford, E. C. Morrison, P. J. Rawlings | J. B. Hogan | Port Line |
| *Port Sydney* | 11.2.65 | L. J. Skailes | K. F. Speirs, J. Burtt, G. Botterill, R. N. Cubin | L. J. O'Sullivan | Port Line |
| *Port Townsville* | 7.10.64 | R. A. Holmes | R. J. M. Grey, G. N. R. Squire, C. G. W. Hunter | A. I. Thompson | Port Line |
| *Port Victor* | 1.3.65 | L. W. Cady | M. G. Jarrod, B. J. Hayball, M. S. Triplett | T. R. Britt | Port Line |
| *Port Vindex* | 28.1.65 | C. J. H. Gorley | J. W. Goldsmith, F. J. Carter, M. C. Pilgrim | | Port Line |
| *Port Wellington* | 8.5.64 | C. A. Hodson | C. G. B. Bennetts, B. R. Queree, P. J. Dewar | R. Slater | Port Line |
| *Port Wimbledon* | 24.2.65 | E. Peirce | J. R. Freestone, A. Cameron, P. Fletcher | C. Cox | Watts, Watts & Co. Ltd. |
| *Port Wyndham* | 21.12.64 | A. L. Smith | R. S. Butler, B. Eaton, G. Smith | T. G. McGrath | Port Line |
| *Potaro* | 4.2.65 | E. J. O'Keeffe | R. F. Dymott, M. R. Childs, M. Hobbs | J. Neenam | Royal Mail Lines |
| *Potosi* | 18.3.65 | P. D. O'Driscoll | J. Gardner, D. B. Bird, F. Strachan | F. J. Curran | Pacific S.N. Co. Ltd. |
| *Pretoria Castle* | 23.3.65 | J. P. Smythe, D.S.C., R.D. | J. N. C. Greaves, I. Dewar, D. R. Johnston | G. Kilmister, M.B.E. | Union Castle Line |
| *Queen City* | 19.6.64 | A. W. J. Justen | A. D. Lightfoot | C. Knight | Sir Wm. Reardon Smith & Sons |
| *Queen of Bermuda* | 16.1.64 | M. E. Musson | S. Vass, M. Gough, R. House | R. Stennet | Furness Lines |
| *Queensland Star* | 11.3.65 | R. White, D.S.C. | J. Sanderson, D. McNeil, J. Whitehead | I. Anderson | Blue Star Line |
| *Rakaia* | 29.3.65 | F. S. Angus | W. J. N. Drummond, L. E. Howell, R. Davis, J. R. Jackson | R. Birkinshaw | New Zealand Shipping Co. Ltd. |
| *Ramillies* | 21.8.64 | W. J. Thomas | | | J. Cory & Son Ltd. |
| *Ramon De Larrinaga* | 8.3.65 | W. McKechanie | D. Parry, J. Crane, B. Milligan, J. Ross | W. Noonan | Larrinaga S.S. Co. |
| *Ramore Head* | 26.11.64 | R. Harris | D. Mahon, R. Maxwell, B. McMurray | E. Adams | Head Line |
| *Rangitane* | 26.11.64 | D. H. Chadwick | D. R. J. Plimsaul, R. A. Fallowfield-Wilson, P. N. Cowdell, D. R. Mountford | L. C. Whittington | New Zealand Shipping Co. Ltd. |
| *Rangitoto* | 11.3.65 | L. W. Fulcher | M. W. Williams, R. E. Barnard, B. C. Davis, R. J. G. Vincent | W. F. Shepherd | New Zealand Shipping Co. Ltd. |
| *Raphael* | 23.11.64 | C. E. Legg | G. Dobbie, R. Jones, A. Edmunds | J. Marnell | Lamport & Holt Line |
| *Rathin Head* | 19.1.65 | T. McI. Hamill | J. W. Auld, B. Kernahan, P. J. Sherriff, H. I. Lavery | R. H. Walshe | Head Line |
| *Redcar* | 22.3.65 | J. Parsloe | W. G. Ogle, M. Pitick, W. Crook, G. W. Brown | J. Ingham | Bolton S.S. Co. Ltd. |
| *Regent Eagle* | 15.2.65 | B. Rehse | J. M. Acton, R. Hawkins, D. G. Blair | R. Milner | Regent Petroleum Tankship Co. Ltd. |
| *Regent Falcon* | 6.11.64 | R. Armstrong | M. T. Hutton, R. Mitchell, P. J. Stead | J. Jenkins | Regent Petroleum Tankship Co. Ltd. |
| *Regent Royal* | 14.1.65 | C. A. Chadwick | P. W. Roberts, I. E. McVicar, A. J. Cavey | B. A. Livesley | Regent Petroleum Tankship Co. Ltd. |

## Selected Ships (*contd.*)

| Name of Vessel | Last Return Received | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|---|
| *Rhodesia Castle* | 16.2.65 | A. C. M. Black, O.B.E. | G. H. Ball, D. Youles, C. Brown | P. Thomas | Union Castle Line |
| *Rialto* | 14.8.64 | J. F. O'Rourke | B. Robinson, D. M. Smee, H. Blagdan | T. A. Herlihy | Ellerman's Wilson Line |
| *Richard De Larrinaga* | 11.3.65 | L. G. Daniel | R. I. Thomas, J. Sullivan, C. Bufton | C. W. Turner | Larrinaga S.S. Co. |
| *Richmond Castle* | 15.6.64 | C. E. Lorains | S. Stokes, J. W. Tricket, W. C. McFarland | R. M. Mercer | Union Castle Line |
| *Ringdove* | 12.3.65 | C. Prescott | R. B. Middleton, D. T. Miles, G. Fraser, R. Hayton | | General S.N. Co. Ltd. |
| *Ripon* | 19.10.64 | J. J. Grugan | M. D. J. Jessup, C. Ingham, J. Porter | G. Burnett | Bolton S.S. Co. Ltd. |
| *River Afton* | 31.12.64 | J. W. Chinnery | R. Mattik, W. E. E. Lake | G. M. Hargreaves | Hunting & Son Ltd. |
| *Romanby* | 28.12.64 | J. E. Roddam | | | Sir R. Ropner & Son Ltd. |
| *Roonagh Head* | 11.8.64 | W. A. Haddock, O.B.E. | | | Head Line |
| *Rosemary Everard* | * | W. G. Hunt | J. Mallam, J. Skinner | | F. T. Everard & Sons Ltd. |
| *Rowallan Castle* | 18.2.65 | R. M. Wright | I. McG. Marr, N. W. M. Curd, G. R. Kyte | C. Hosker | Union Castle Line |
| *Ruahine* | 22.12.64 | H. N. Lawson, R.D. | P. J. B. Low, P. R. Barr, J. F. Bollard, M. H. Lawrence | C. Lambe | New Zealand Shipping Co. Ltd. |
| *Runswick* | 12.3.65 | S. Ward | | | Headlam & Son Ltd. |
| *Rushpool* | 17.3.65 | A. C. Duncan | W. Burdon, W. B. Rial, S. Beckett | M. MacNeil | Sir R. Ropner & Son Ltd. |
| *Sagamore* | 18.3.65 | W. F. Swann | B. C. Hodges, J. G. Usher | R. A. Wilson | Furness Lines |
| *Salamanca* | 16.2.65 | P. Le Whitaker | J. C. Manders, D. Ellis, R. Gardner | R. Slater | Pacific S.N. Co. Ltd. |
| *Salaverry* | 28.9.64 | D. Houghton | A. R. Hudson, L. Hayler, R. M. Cosgrove | W. Stone | Pacific S.N. Co. Ltd. |
| *Salinas* | 30.9.64 | W. J. Campbell | M. G. Smith, B. J. Goodall, J. McBride, I. J. Kelly | R. Shepherd | Pacific S.N. Co. Ltd. |
| *Salmela* | 30.3.65 | M. B. Scott | D. C. Tait, W. S. Sinclair, J. S. Clapperton | N. G. Smith | Chr. Salvesen & Co. Ltd. |
| *Samaria* | * | M. F. Hehir | J. Griffiths, M. Johnson, J. A. Cacquhoun | M. Maclean | Cunard Line |
| *Santander* | 23.3.65 | R. T. Riley | I. R. Halsall, J. K. Spencer, M. I. Llewellyn | C. Gamwell | Pacific S.N. Co. Ltd. |
| *Sarmiento* | 1.3.65 | E. Gowland | N. Michael, M. J. Ratcliffe, D. J. Bishop | W. Elliott | Pacific S.N. Co. Ltd. |
| *Saxonia* | 5.3.65 | G. E. Smith | M. N. Wadsworth, J. King, G. Ferguson, S. L. Gilchrist | J. MacDonald | Cunard Line |
| *Scottish Hawk* | 24.3.64 | J. Thorn | D. S. Williams, P. Flatau, W. Moss, R. A. Milne | N. E. Wynne | Scottish Tanker Co. Ltd. |
| *Scottish Star* | 26.3.65 | M. R. Bremberg | J. Downie, R. Bremner, R. Gordon | J. Hunter | Blue Star Line |
| *Scythia* | * | D. C. Drummond | J. D. Goblie, J. B. Clemenson, M. J. Mills | A. Macdonald | Cunard Line |
| *Serenia* | 19.1.65 | J. Kell, M.B.E. | L. J. Strangman, G. E. Bennison, M. Williams | J. V. Winchester | Shell Tankers (U.K.) Ltd. |
| *Shackleton* | 22.5.64 | D. H. Turnbull | R. Lapthorn, J. Cole, S. Culshaw | | British Antarctic Survey |
| *Shahristan* | * | R. Hodgson | J. Buce, J. Wightman, D. Carden | R. Petch | Strick Line |
| *Shropshire* | 16.11.64 | M. C. Mills | H. A. Scott, K. Gowsell, D. Greenfield | C. Beyer | Bibby Line |
| *Sidonia* | 26.11.64 | A. J. F. Colquhoun, M.B.E. | J. Swan, J. Henderson, J. S. Jones, R. R. Watt | R. Smith | Anchor Line |
| *Silksworth* | 31.3.65 | N. Thompson | R. H. Henson, W. D. Beattie, S. A. Ajmal, W. F. Firman | B. T. Holden | R. S. Dalgliesh Ltd. |
| *Silverbeck* | 17.2.64 | A. A. Walker | M. C. McGregor, J. V. Gilbert | D. B. Drummond | Silver Line |
| *Silvercrag* | 8.3.65 | M. R. Duke | M. J. Paine, M. J. Stammer, G. Salter, D. G. Roberts | C. W. Needham | Silver Line |
| *Silversand* | 24.3.65 | P. L. Hopkins | K. A. Haigh, W. L. Wood, J. A. Westerman, J. H. Cloke | A. P. G. Gray | Silver Line |
| *Sir Lancelot* | 3.3.65 | E. C. Plowman | L. D. Wood, E. A. Oram, W. J. Cork, M. W. Pudden | W. N. Duguid | British India Line |
| *Sir William Hardy* | 9.3.65 | A. Whittleton | | | Torry Research Station |
| *Sneaton* | 12.11.64 | J. S. Pinkney, O.B.E. | A. D. Stuart, T. Hamilton | P. J. Costelloe | Headlam & Son Ltd. |
| *Socotra* | 10.6.64 | S. A. Turk | N. E. Sealey, E. Alexander, P. H. Williams | D. Warth | P. & O.-Orient Line |
| *Somerset* | 24.11.64 | A. C. Davies | A. J. Champion, A. Dorkins, J. Jackson, M. Rowland-Hill | S. L. Adams | Federal Line |
| *Southern Cross* | 1.3.65 | L. J. Hopkins | N. R. Godfrey, M. Hairsine, W. M. Douglas | —. Higginbottom | Shaw Savill Line |
| *Staffordshire* | 12.1.65 | T. Cooper, D.S.C. | C. R. Tiller, S. R. Dyer, M. H. Case | W. S. Hopwood | Bibby Line |
| *Stirling Castle* | 11.1.65 | D. W. Sowden, R.D. | J. Gregson, B. L. Reid, K. M. Whitting | D. G. Bristow | Union Castle Line |
| *Suevic* | 12.1.65 | H. H. Falkiner | A. D. C. Payne, J. M. Bain, P. J. Marchbank | W. Williams | Shaw Savill Line |
| *Suffolk* | 26.3.65 | H. J. D. Sladen | A. D. Welsh, A. Chisholm, B. J. Prince, M. K. Handfield | R. Irwin | New Zealand Shipping Co. Ltd. |
| *Sugar Carrier* | 22.2.65 | J. R. L. Atkinson | D. E. Mawhinney, H. Scalley, N. Lancaster, J. B. Brown | G. MacGarrigle | Sugar Line |
| *Sugar Producer* | * | J. Hunt | J. Abbott, —. Mackay, J. Lewis | G. MacGarrigle | Sugar Line |
| *Sugar Refiner* | 15.2.65 | J. R. Cassidy | J. P. B. Clark, R. C. Edwards, V. R. Gibson, R. I. Watson | B. Kenny | Sugar Line |

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| *Sugar Transporter* | * | T. W. Day | V. R. Gibson, F. Bowden, C. McClean | B. Low | Sugar Line |
| *Sunda* | 15.2.65 | R. Bullock-Webster | C. T. Godderidge, D. M. Swetnam, R. L. Jackson | G. C. Alton | P. & O.-Orient Line |
| *Sunek* | 11.3.65 | H. Syversen | D. C. W. Donaldson, R. G. C. Roberts, R. W. Espley | T. Canty | John Kilgour & Co. Ltd. |
| *Surrey* | 22.3.65 | J. F. Milner | M. K. Handfield, M. Bosworth, D. Veal, A. J. H. Milne-Home | T. L. Connelly | New Zealand Shipping Co. Ltd. |
| *Sussex* | 3.11.64 | J. R. Ramsay | C. Brownings, R. Longworth, R. Jones, M. Parry | D. Hinds | Federal Line |
| *Sydney Star* | 7.8.64 | C. P. Leighton | P. E. Long, P. W. Hutchinson, N. M. U. Clume | D. R. Whitehead | Blue Star Line |
| *Sylvania* | 26.2.65 | H. J. Chaloner, R.D. | P. J. T. Kendall, J. G. Parry | A. N. Henderson | Cunard Line |
| *Tabaristan* | 20.11.64 | T. D. Dumont | A. C. McCulloch, G. S. Forbes, S. T. S. Household | J. F. Bryson | Strick Line |
| *Tactician* | 24.2.65 | R. H. K. Ledger | J. K. Robinson, M. H. McFarlin, J. B. Dodds, J. Maddison | F. B. Lawton | Harrison Line |
| *Tamele* | 1.7.64 | J. W. Hutchinson | B. W. Fowler, J. M. Murray | R. Seaward | Elder Dempster Lines |
| *Tantallon Castle* | 5.3.65 | W. R. Carr | R. A. Slack, I. C. Munro, R. L. Olden, T. N. Geesin | J. H. Lamb | Union Castle Line |
| *Tarkwa* | 30.11.64 | J. A. Cleator | R. Madgee, J. Melia, A. Crawford | D. Greaves | Elder Dempster Lines |
| *Tasmania Star* | 13.7.64 | C. H. Watson | J. C. R. Hall, R. Fells, N. Houghton | F. G. Huggett | Blue Star Line |
| *Thistledowne* | 14.1.65 | C. C. Brown | F. L. Barnes | J. R. Drake | Allan Black & Co. |
| *Tidecrest* | 28.7.64 | E. J. Best | J. R. Dunstan, A. Borlase, M. Dempsey | I. R. Bell | Ivanovic & Co. Ltd. |
| *Tinto* | 6.11.64 | R. Cudbertson | D. Nesbitt, I. G. Walker | | Ellerman's Wilson Line |
| *Torr Head* | 7.1.65 | E. G. Davey | E. R. Dunwoody, A. Niblock, D. Alexander, W. Morrison | M. J. P. Hannon | Head Line |
| *Transvaal Castle* | 4.2.65 | N. M. Lloyd | T. Kearsey, F. Glibbery, A. MacDonald, R. Silverwood | R. Brew | Union Castle Line |
| *Trebartha* | 23.11.64 | C. E. Pratt | J. Carmichael, J. R. Darby, R. S. V. Lockwood-Taylor | C. B. Turner | Hain S.S. Co. Ltd. |
| *Trecarne* | 6.8.64 | L. J. Annett | M. R. Cowtan | B. Smith | Hain S.S. Co. Ltd. |
| *Trecarrell* | 5.3.65 | E. F. Boyd | M. A. Cooper, D. R. Mitchell, J. Davies | M. Alder | Hain S.S. Co. Ltd. |
| *Trefusis* | 7.9.64 | G. Joslin | M. J. Ball, D. C. Penberthy, R. S. James | I. Farren | Hain S.S. Co. Ltd. |
| *Tremayne* | 16.6.64 | R. J. Richards | C. K. Newton, J. E. Johnson, J. Davies | R. J. T. Hemmings | Hain S.S. Co. Ltd. |
| *Tremeadow* | 18.2.65 | L. J. Annett | R. F. Morris, R. J. Smith, J. J. Watson | J. P. McMahon | Hain S.S. Co. Ltd. |
| *Tremorvah* | 30.10.64 | R. J. Richards | R. G. Whisker, R. C. Lister, J. H. Bache, A. G. Thomas | P. G. Prestidge | Hain S.S. Co. Ltd. |
| *Treneglos* | 1.7.64 | W. Phillips | C. J. Double, W. Dodson, M. A. Cooper | A. R. Watt | Hain S.S. Co. Ltd. |
| *Trevalgan* | 1.7.64 | I. M. Price | J. M. F. Barnett, J. Spall, T. Raddings | —. Carruthers | Hain S.S. Co. Ltd. |
| *Trevaylor* | 15.6.64 | E. Stewart | B. Lee, G. Foster, F. Marchant | F. Walsh | Hain S.S. Co. Ltd. |
| *Trewidden* | 23.3.65 | E. D. Stewart | I. Smith, J. Cotton, E. Bowery | R. A. H. Clarke | Hain S.S. Co. Ltd. |
| *Turakina* | 12.12.63 | D. B. Brittain | M. Perfect, T. Thompson, C. C. Hufflitt, R. Bayliss | W. Aitchison | New Zealand Shipping Co. Ltd. |
| *Turkistan* | 29.7.64 | R. L. Cain | J. S. Catlow, J. Brown, D. E. Walshe | H. Finlay | Strick Line |
| *Uganda* | 26.11.64 | J. D. Hamilton | C. D. Mason, S. Maitland, I. Walker, R. Wilson | | British India Line |
| *Velletia* | 22.2.65 | H. W. Fortnam | J. M. Thompson, C. M. Stewart, M. J. Dennis | W. G. Harrison | Shell Tankers (U.K.) Ltd. |
| *Venassa* | 13.11.64 | A. M. Chapman | T. C. W. Rees, B. Bromby, A. N. Aitken, J. L. H. Hudd | S. Boner | Shell Tankers (U.K.) Ltd. |
| *Volvatella* | 7.12.64 | A. R. Spearman | C. J. Robinson, T. Dillon, I. Wragg, —. Jebson | T. Dunsire | Shell Tankers (U.K.) Ltd. |
| *Waiwera* | 6.7.64 | F. Charnley | G. B. Ward, M. Lindsey, M. Douglas | J. L. Glanton | Shaw Savill Line |
| *Wan Liu* (ex. *Wanstead*) | 1.2.65 | J. D. Smith | G. Drewery, D. Packman, J. F. M. McGlinchey, M. J. Tidey | M. R. Windley | Watts, Watts & Co. Ltd. |
| *Warkworth* | 21.8.64 | A. Hurst | B. R. Tillotson, E. Curling, K. Scollay | E. M. Barker | R. S. Dalgliesh Ltd. |
| *Waroonga* | 18.12.64 | P. H. Bidmead | S. R. Young, M. M. Lindsay, S. L. Riddle | J. H. McFarland | British India Line |
| *Welsh City* | 25.1.65 | D. L. Beynon | R. M. Gidden, K. Milburn, D. J. Ferris | E. A. Willocks | Sir Wm. Reardon Smith & Sons |
| *Welsh Herald* | 18.3.65 | A. S. Anthony | C. C. Davidson, B. Wright, M. Wilson | I. Watson | Welsh Ore Carriers Ltd. |
| *Westbank* | 24.2.65 | L. O. Moody | J. S. Allan, T. J. Chute | J. Carmody | Bank Line |
| *Weybridge* | 15.4.64 | E. A. Peirce | J. Coleman, M. England, A. Hughes | P. Whittle | Watts, Watts & Co. Ltd. |
| *Willowpool* | * | F. D. Lloyd | T. Jones, C. Tingle, R. Taylor | W. Limpet | Sir R. Ropner & Son Ltd. |
| *Windsor Castle* | 26.1.65 | A. G. V. Patey, C.B.E. | A. J. Stewart, J. King, B. Cates | E. Pitt | Union Castle Line |
| *Woo Sung* (ex. *Woodford*) | 3.12.64 | D. G. Martin | R. E. Baker, D. H. Wells, M. J. Flanagan | P. G. Crawford | Watts, Watts & Co. Ltd. |
| *Yorkshire* | 1.3.65 | A. E. Young | R. Birkett, F. G. Gurney, D. H. Mobberley | G. J. Brumby | Bibby Line |
| *Zaphon* | 31.3.65 | G. A. Nelson | C. J. Burls, C. C. Waugh, R. F. Cre, R. Palmer | E. A. Richardson | Shell Tankers (U.K.) Ltd. |

# Supplementary Ships

| Name of Vessel | Last Return Received | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|---|
| *Aaro* | 6.11.64 | W. C. Gill | P. C. Poston, D. Train, J. Strachan, J. Jones | F. Nicoll | Ellerman's Wilson Line |
| *Apollo* | 19.8.64 | G. V. Barnes | J. A. Cross, R. R. McDonald, E. Julian | | Bristol S.N. Co. Ltd. |
| *Ariosto* | 21.12.64 | N. O. Cook | P. C. Poston | P. Body | Ellerman's Wilson Line |
| *Bendoran* | 5.3.65 | J. Cringle | G. F. Marriott | A. Dobson | Ben Line |
| *Benlawers* | 9.10.64 | J. L. Forsyth | M. R. Nisbet, M. R. Cameron, T. Coulter | P. McMeeking | Ben Line |
| *Benmacdhui* | 11.2.65 | W. C. Watson | G. M. McCrone, T. M. Robertson, R. Arkless | J. W. Kenny | Ben Line |
| *Benvorlich* | 12.10.64 | J. R. Morrison | J. A. McIntosh, D. Brown, A. Wilson | A. Gordon | Ben Line |
| *Border Shepherd* | • | E. L. Lloyd | D. W. Holt, R. R. Finlay, K. R. Farrow | | Lowland Tanker Co. Ltd. |
| *Borodino* | 21.10.64 | A. T. Jardine | G. Mitchell, R. A. Blencoe, B. Taylor | A. D. Sinclair | Ellerman's Wilson Line |
| *British Chivalry* | 8.1.65 | N. Rutherford | J. D. Restall, A. K. Aitken | J. C. O'Brien | B.P. Tanker Co. Ltd. |
| *British Destiny* | 10.3.65 | H. H. Harris | S. Plumb, D. Brown, M. Dunning | | B.P. Tanker Co. Ltd. |
| *British Energy* | 20.1.65 | J. E. S. Robinson | | J. McCusker | B.P. Tanker Co. Ltd. |
| *British Oak* | 25.2.65 | T. H. Evans | A. M. MacKenzie, R. Mackay, J. A. Wiseman | M. A. Fallon | B.P. Tanker Co. Ltd. |
| *British Reliance* | 21.1.65 | S. C. Davies | K. C. Newcombe, D. McCallum, G. B. Sinclair | I. R. Uttley | B.P. Tanker Co. Ltd. |
| *Byland Abbey* | 16.6.64 | T. W. Westerdale | F. W. Cooper, M. Goodman | A. Stockdale | Associated Humber Lines Ltd. |
| *Camellia* | 12.5.64 | G. W. Mortimer | G. O. Cox | P. Brennan | J. Robinson & Son |
| *Carlo* | 17.5.62 | E. R. Corp | J. G. Jones, M. W. Salsbury, J. Ayers, E. P. Metham | M. Powell | Ellerman's Wilson Line |
| *Catford* | 28.7.64 | E. Clarke, M.B.E. | L. Thompson | A. Corkhill | South Eastern Gas Board |
| *Cicero* | 28.10.63 | E. Tyler | R. A. Blencoe, C. R. Tutty, J. D. Edwards, L. Gibson | R. A. Newton | Ellerman's Wilson Line |
| *Circassia* | 21.10.64 | W. S. Thomson, O.B.E. | R. Langmuir, R. Logan, A. Brydon | D. Letcher | Anchor Line |
| *Croydon* | 21.9.64 | H. G. N. D'Evelin | B. W. Knill | A. W. Dixon | South Eastern Gas Board |
| *Dido* | 18.3.65 | N. J. Llewellyn | M. J. Hogan, L. Edwards | M. J. Hogan | Bristol S.N. Co. Ltd. |
| *Echo* | 20.1.65 | J. L. Jenkins | A. H. Sims, H. H. Grant | | Bristol S.N. Co. Ltd. |
| *Esso Lancashire* | 4.2.65 | J. Warby | G. Gair, M. Whelan, R. Rushworth | P. O'Callaghan | Esso Petroleum Co. Ltd. |
| *Glitra* | 21.10.64 | G. Walterson | C. Begg, G. Massie, K. M. MacRae | | Chr. Salvesen & Co. Ltd. |
| *Gloxinia* | 10.6.64 | J. Shaw | W. M. Sutherland, E. Hutchinson, M. D. Staniforth | M. E. St.G. McClenaghan | Stag Line Ltd. |
| *Hero* | 1.3.65 | W. Kays | A. S. Phillips, R. Roberts | | Bristol S.N. Co. Ltd. |
| *Hudson Deep* | 17.6.64 | F. Wickman | | | Hudson S.S. Co. Ltd. |
| *Junella* | • | L. Fewster | W. Davies | W. Davies | J. Marr & Sons Ltd. |
| *Kirkham Abbey* | 30.9.64 | F. W. Wooler | P. D. Cummings | | Associated Humber Lines Ltd. |
| *Logna* | 1.6.64 | J. Clark | J. W. T. Low, C. F. Irvine | | Chr. Salvesen & Co. Ltd. |
| *Lord Codrington* | 6.12.63 | R. Hanson | A. Kamdron, J. King, J. Whitney | T. O. Bradey | Ship's Finance & Management Co. Ltd. |
| *Malmo* | 12.11.64 | A. R. Whittleton | D. Davidson, L. Gibson | W. McCarthy | Ellerman's Wilson Line |
| *Mangla* | 5.8.64 | J. P. Brand | | | Brocklebank Line |
| *Maskeliya* | 4.1.65 | A. C. Sprigings | | | Brocklebank Line |
| *Mawana* | 1.2.65 | J. P. Jackson | J. A. Ellerbeck, A. R. Wood, J. P. Fillingham, P. Wood | E. MacKinnon | Brocklebank Line |
| *Milo* | 24.3.65 | J. F. Tremlett | A. A. James | E. Foley | Bristol S.N. Co. Ltd. |
| *Mobil Acme* | • | J. George | D. W. C. Davies, J. Burnet, J. Innes | G. McDanielson | Mobil Shipping Co. Ltd. |
| *Mobil Apex* | • | J. A. Miller | K. Tree, K. J. Beverley, D. Wright | R. Hart | Mobil Shipping Co. Ltd. |
| *Mobil Enterprise* | • | J. James | P. Callaghan, G. R. Holder, G. U. C. Harker | H. Fisher | Mobil Shipping Co. Ltd. |
| *Northella* | • | C. H. G. Drever | J. McCarroll | J. McCarroll | J. Marr & Sons Ltd. |
| *Orelia* | • | R. Leach | J. Bailey, D. M. Steele, J. Jacques | H. Dunning | Houlder Bros. Ltd. |
| *Riseley* | • | J. Ord | J. Milne, T. Roberts, M. Donkin | J. D. Rye | Stephens, Sutton Ltd. |
| *St. Finbarr* | • | T. Sawyers | | C. Gill | Thos. Hamling & Co. Ltd. |
| *St. Giles* | 28.12.64 | G. W. Argumont | K. C. Stone | K. C. Stone | Thos. Hamling & Co. Ltd. |

| | | | | | |
|---|---|---|---|---|---|
| *St. Matthew* | 21.10.64 | P. E. Craven | D. L. Verity | D. L. Verity | St. Andrews Steam Fishing Co. Ltd. |
| *Soutra* | 4.5.64 | W. H. Spence | | | Chr. Salvesen & Co. Ltd. |
| *Stella Leonis* | 15.2.65 | R. Waller | R. R. N. Laing | R. R. N. Laing | Charleson Smith Trawlers Ltd. |
| *Stella Orion* | 2.12.64 | G. Whur | A. Ramsay | A. Ramsay | Charleson Smith Trawlers Ltd. |
| *Streambank* | 7.11.63 | A. M. Williamson | J. Morrison, S. Mallory, P. J. Lanchdon, L. C. Tate | B. A. Stock | Bank Line |
| *Sylvan Arrow* | * | R. H. Robinson | A. R. Dunn, T. C. Lack, C. J. Parkin, W. MacDougall | M. A. Plaice | Mobil Shipping Co. Ltd. |
| *Thistleroy* | * | C. C. Brown | R. Hewitt, J. S. Nuttall, W. A. Hill | | Allan Black & Co. |
| *Tolsta* | 8.10.64 | —. Baikie | P. H. Telfer, J. Black, W. Hunter, A. Gibson | | Chr. Salvesen & Co. Ltd. |
| *Truro* | 28.12.64 | J. K. Marrow, M.B.E. | J. M. Jarratt, B. A. Gash, G. T. Bell | A. T. Ruddock | Ellerman's Wilson Line |
| *Tudor Prince* | 15.11.63 | A. H. Kent | B. Ditchburn, M. Smith, G. Wilson, B. S. Young | P. Richardson | Prince Line |
| *Tynemouth* | 8.1.64 | J. Barrass | G. Wood, A. Robertson | J. F. Morris | Burnett S.S. Co. Ltd. |
| *Volo* | 18.10.63 | W. K. Tadman | L. Gibson, R. Jones | J. Strong | Ellerman's Wilson Line |
| *Winga* | 30.12.64 | R. J. McNinch | A. Macintyre | W. C. Doyle | Glen & Co. Ltd. |
| *York* | 17.2.65 | J. W. Laverack | D. Peacham, B. Tong, B. D. Lee, R. Shaw | | Associated Humber Lines Ltd. |

## Trawlers

The following is a list of trawler skippers and radio operators who voluntarily observe and report those elements of the weather which do not entail the use of any meteorological instruments (irrespective of the vessels in which they sail).

| Skipper | Radio Operator | Trawler Owner/Manager |
|---|---|---|
| P. D. Abbey | G. Sowerby | Firth Steam Trawling Co. Ltd. |
| B. A. Ashcroft | A. J. Nettleship | Hellyer Bros. Ltd. |
| F. Barwick | S. J. MacIntosh | Thos. Hamling & Co. Ltd. |
| A. Blenkin | G. Gerlach | Thos. Hamling & Co. Ltd. |
| W. Fry | C. Knaggs | Kingston Steam Trawling Co. Ltd. |
| H. Hall | G. Gerlach | Thos. Hamling & Co. Ltd. |
| M. Hough | G. Brocklesby | Firth Steam Trawling Co. Ltd. |
| J. Kersey | E. D'Constantine | Hudson Bros. Trawlers Ltd. |
| W. March | J. Black | Hellyer Bros. Ltd. |
| C. A. Nielsen | R. T. Murphy | Kingston Steam Trawling Co. Ltd. |
| R. Suddaby | A. J. Nettleship | Hellyer Bros. Ltd. |
| E. Thundercliffe | C. Duplock | Hellyer Bros. Ltd. |

## Training Establishments

The following is a list of Training Establishments which submit logbooks, kept by the cadets under training.

| Establishment | Captain/Superintendent |
|---|---|
| *Conway*, H.M.S. | E. Hewitt, R.D. Capt. R.N.R. |
| Pangbourne Nautical College | A. F. P. Lewis, C.B.E. Capt. R.N. (Retd.) |
| Reardon Smith Nautical College | J. N. Rose, R.D., Lt. Cdr. R.N.R. (Retd.) |
| Warsash School of Navigation | G. W. Wakeford, M.B.E. |
| *Worcester*, H.M.S. | L. W. L. Argles, O.B.E., D.S.O., R.N. (Retd.) |

# 'Marid' Ships

The following is a list of ships recruited for the observing and reporting of sea temperatures from coastal waters of Great Britain. Captains are requested to point out any errors or omissions in the list.

| Name of Vessel | Captain | Owner/Manager |
|---|---|---|
| *Adriatic Coast* | H. Mair | Coast Lines Ltd. |
| **Alderney Coast* | G. S. Palmer | British Channel Islands Shipping Co. Ltd. |
| *Allen Commodore* | C. Bott | Commodore Shipping Co. Ltd. |
| **Amsterdam* | H. Jennings | British Railways Board |
| **Angularity* | D. O'Leary | F. T. Everard & Sons Ltd. |
| **Arnhem* | C. Witchell | British Railways Board |
| *Ballylagan* | A. Barrow | John Kelly Ltd. |
| *Bardic Ferry* | K. Hockings | Atlantic S.N. Co. Ltd. |
| **Brenda* | J. McKinnon | Dept. of Agriculture & Fisheries for Scotland |
| *B.P. Manager* | F. M. Cain | Shell-Mex & B.P. Ltd. |
| *B.P. Transporter* | P. Brown | Shell-Mex & B.P. Ltd. |
| *Caesarea* | V. Newton | British Railways Board |
| *Caledonian Coast* | F. Mara | Coast Lines Ltd. |
| *Cambria* | W. J. Roberts | British Railways Board |
| *Cantick Head* | A. E. Alvis | Henry & Macgregor Ltd. |
| *Cardiffbrook* | P. R. Holton | Comben, Longstaff & Co. Ltd. |
| *Cerdic Ferry* | C. E. Tanner | Atlantic S.N. Co. Ltd. |
| *Cheshire Coast* | C. A. Hopkins | Coast Lines Ltd. |
| *Clarebrook* | R. Anderson | Comben, Longstaff & Co. Ltd. |
| *Claymore* | N. Campbell | David MacBrayne & Co. |
| **Clupea* | J. Jappy | Dept. of Agriculture & Fisheries for Scotland |
| **Corfen* | F. Martin | Wm. Cory & Son Ltd. |
| **Cormoat* | A. E. Pussey | Wm. Cory & Son Ltd. |
| *Corncrake* | A. E. Guest | General S.N. Co. Ltd. |
| *Darlington* | W. Brown | Associated Humber Lines Ltd. |
| **Doric Ferry* | D. Burgess | Atlantic S.N. Co. Ltd. |
| *Dorset Coast* | W. R. Walker | British Railways Board |
| **Dryburgh* | G. Patience | G. Gibson & Co. Ltd. |
| *Duke of Argyll* | D. A. Ponting | British Railways Board |
| *Duke of Lancaster* | —. Greenwood | British Railways Board |
| *Duke of Rothesay* | J. B. Williams | British Railways Board |
| *Elk* | A. B. Moir | British Railways Board |
| *Elwick Bay* | W. G. Dennison | Elwick Shipping Co. |
| *Ettrick* | J. Murray | G. Gibson & Co. Ltd. |
| *Fauvic* | H. S. Shugar | Channel Shipping Ltd. |
| *Fernhurst* | E. C. Ford | Stephenson, Clarke Ltd. |
| *Ferryhill* | J. Innes | Aberdeen Coal & Shipping Co. Ltd. |
| **Fulham X* | D. Battle | Stephenson, Clarke Ltd. |
| *Gaelic Ferry* | J. W. Cowie | Atlantic S.N. Co. Ltd. |
| *Hadrian Coast* | W. Grogan | Coast Lines Ltd. |
| *Hebrides* | D. Gunn | David MacBrayne & Co. |
| **Helmsdale* | A. Ross | Northern Trading Co. Ltd. |
| **Heron* | W. Lockhart | General S.N. Co. Ltd. |
| *Hesperus* | D. MacCorquodale | Northern Lighthouse Board |
| *Hibernia* | E. A. Horspool | British Railways Board |
| *Hibernian Coast* | G. Mearns | Coast Lines Ltd. |
| **Iberian Coast* | D. Cullins | Tyne, Tees Shipping Co. Ltd. |
| **Innisfallen* | T. McVeigh | City of Cork Steam Packet Co. |
| *Ionic Ferry* | W. Close | Atlantic S.N. Co. Ltd. |
| *Irish Coast* | D. McAllister | Coast Lines Ltd. |
| *Jade* | A. Fletcher | Wm. Robertson Ltd. |
| *Jersey Coast* | J. C. Casey | Coast Lines Ltd. |
| *Kelvin* | H. A. Mathesen | Wm. Sloan & Co. Ltd. |
| **Killingholme* | W. J. Mair | Shell-Mex & B.P. Ltd. |
| *Lairds Crest* | J. T. Wood | Burns & Laird Line Ltd. |
| *Lairds Glen* | F. M. Flint | Burns & Laird Line Ltd. |
| **Lairds Loch* | L. Stewart | Burns & Laird Line Ltd. |
| *Lancashire Coast* | P. A. Johnson | Coast Lines Ltd. |
| **Leinster* | G. Barry | Coast Lines Ltd. |
| *Loch Ard* | A. Campbell | David MacBrayne & Co. |
| *Loch Carron* | A. Matheson | David MacBrayne & Co. |
| *Loch Linnhe* | H. McArtney | J. Rainey Ltd. |
| **Loch Seaforth* | A. Matheson | David MacBrayne & Co. |
| *Melrose* | J. D. Mackenzie | G. Gibson & Co. Ltd. |
| *Mitcham* | W. L. Purvis | South Eastern Gas Board |
| *Moose* | B. Picot, R.D. | British Railways Board |
| **Munster* | J. Williams | Coast Lines Ltd. |
| *Mytongate* | F. Williams | Hull Gates Shipping Co. |
| *Netherlands Coast* | E. Fisher | Tyne, Tees Shipping Co. Ltd. |
| *Olivian Coast* | T. S. Stewart | Tyne, Tees Shipping Co. Ltd. |
| *Orselina* | T. M. Jarvis | Commodore Shipping Co. Ltd. |
| **Pearl* | W. Campbell | Gem Line |
| **Peregrine* | L. Gillings | Great Yarmouth S.S. Co. |
| *Pharos* | C. Campbell | Northern Lighthouse Board |
| *Pluto* | E. H. Jones | Bristol S.N. Co. Ltd. |
| *Pole Star* | A. W. Walker | Northern Lighthouse Board |
| *Princess Maud* | R. Roberts | British Railways Board |

* These ships report wind and weather.

## 'Marid' Ships (*contd.*)

| Name of Vessel | Captain | Owner/Manager |
|---|---|---|
| *St. Andrew/St. David* | D. Griffiths | British Railways Board |
| •*St. Clair* | T. Gifford | North of Scotland Shipping Co. Ltd. |
| *St. Magnus* | J. Harvey | North of Scotland Shipping Co. Ltd. |
| *St. Patrick* | C. E. Hatchley | British Railways Board |
| *Sappho* | R. Mudway | Bristol S.N. Co. Ltd. |
| *Sark Coast* | P. Meras | British Channel Islands Shipping Co. Ltd. |
| *Sarnia* | G. Cartwright | British Railways Board |
| •*Scotia* | A. M. Finlayson | Dept. of Agriculture & Fisheries for Scotland |
| •*Scottish Coast* | A. S. Nicholson | Coast Lines Ltd. |
| •*Seamew* | C. Johnson | General S.N. Co. Ltd. |
| •*Silvio* | H. Whitfield | Ellerman's Wilson Line |
| *Slieve Bawn* | J. D. Nash | British Railways Board |
| *Slieve Bearnagh* | C. D. Cash | British Railways Board |
| *Slieve Bloom* | W. R. Evans | British Railways Board |
| *Slieve Donard* | R. I. Griffiths | British Railways Board |
| *Slieve League* | J. R. Rowlands | British Railways Board |
| *Southern Coast* | H. G. Keilit | Coast Lines Ltd. |
| •*Spray* | J. Andrews | Ellis & McHardy Ltd. |
| *Stormont* | A. N. Blundell | Belfast S.S. Co. Ltd. |
| •*Superiority* | W. O. Jones | F. T. Everard & Sons Ltd. |
| *Talisker* | L. Lamont | Wm. Sloan & Co. Ltd. |
| *Tay* | D. MacDonald | Wm. Sloan & Co. Ltd. |
| •*Teano* | J. Wray | Ellerman's Wilson Line |
| *The President* | A. Turner | J. Hay & Sons |
| *Torquay* | G. Youngson | J. & A. Davidson Ltd. |
| *Treviscoe* | H. S. Shugar | Channel Shipping Ltd. |
| •*Warwickbrook* | D. J. Moyes | Comben, Longstaff & Co. Ltd. |
| *Winchester* | B. Caws, D.S.C. | British Railways Board |
| *Whitby Abbey* | W. Brown | Associated Humber Lines Ltd. |
| *Woodlark* | E. J. Plater | General S.N. Co. Ltd. |

• These ships report wind and weather.

## Light-vessels

| Name of Vessel | Masters |
|---|---|
| *Bar* | C. E. Abott, N. S. Burns |
| *Dowsing* | H. Frost, T. W. Dodd |
| *East Goodwin* | S. R. Woolnough, N. T. Evans |
| *Galloper* | W. G. Burroughs, W. C. Green |
| *Humber* | D. A. Bacon, D. W. Bird |
| *Longstone* (Lt. Ho.) | G. H. Jones, R. D. Evans |
| *Newarp* | G. A. Harris, W. E. Fenn |
| *Royal Sovereign* | B. J. Key, G. Davies |
| *St. Gowan* | W. Semple, R. J. Owen |
| *Seven Stones* | W. E. Harvey, D. J. Harris |
| *Shambles* | A. C. Edwards, H. Price |
| *Shipwash* | S. Goose, J. Goldsmith |
| *Skulmartin* | D. Hawkins, H. Mason |
| *Smith's Knoll* | B. E. Cunham, W. Semple |

# BRITISH COMMONWEALTH

The following lists give the names of Selected and Supplementary Ships, and the number of Auxiliary Ships where known (i.e., those which only report when in 'sparse areas'), which voluntarily co-operate with meteorological services of the British Commonwealth.

*Information for these lists is required by 20th April each year. Information for the January corrective lists is required by 20th October each year.*

## AUSTRALIA (Information dated 1.4.65)

| Name of Vessel | Owner |
|---|---|
| Selected Ships: | |
| *Arafura* | Eastern & Australian S.S. Co. |
| *Aramac* | Eastern & Australian S.S. Co. |
| *Arawatta* | Eastern & Australian S.S. Co. |
| *Bamora* | British India S.N. Co. Ltd. |
| *Baradine* | British India S.N. Co. Ltd. |
| *Barossa* | McIlwraith McEacharn Ltd. |
| *Barpeta* | British India S.N. Co. Ltd. |
| *Bass Trader* | Australian National Line |
| *Bulolo* | Burns Philp & Co. |
| *Burwah* | Howard Smith Ltd. |
| *Cape Don* | Aust. Lighthouse Supply Service |
| *Carpentaria* | British India S.N. Co. Ltd. |
| *Centaur* | A. Holt & Co. |
| *Chakrata* | British India S.N. Co. Ltd. |
| *Chandpara* | British India S.N. Co. Ltd. |
| *Delos* | Australia–West Pacific Line |
| *Empress of Australia* | Australian National Line |
| *Fremantle Star* | Blue Star Line |
| *Hobart Star* | Blue Star Line |
| *Kangaroo* | W. Australian State Shipping Service |
| *Koojarra* | W. Australian State Shipping Service |
| *Koomilya* | Assoc. S.S. Pty. Ltd. |
| *Mahsuri* | Austasia Line Ltd. |
| *Malaita* | Burns Philp & Co. |
| *Malekula* | Burns Philp & Co. |
| *Mandowi* | Austasia Line Ltd. |
| *Milos* | Australia–West Pacific Line |
| *Montoro* | Burns Philp & Co. |
| *Nankin* | Eastern & Australian S.S. Co. |
| *Nellore* | Eastern & Australian S.S. Co. |
| *Port Melbourne* | Port Line |
| *Port New Plymouth* | Port Line |
| *Port Quebec* | Port Line |
| *Rhexenor* | Blue Funnel Line |
| *Rona* | Colonial Sugar Refining Co. |
| *Samos* | Australia–West Pacific Line |
| *Shansi* | Butterfield & Swiare |
| *Soochow* | China Nav. Co. Ltd. |
| *Stentor* | Blue Funnel Line |
| *Tenos* | Australia–West Pacific Line |
| *Tientsin* | China Nav. Co. Ltd. |
| *Townsville Star* | Blue Star Line |
| *Triadic* | Br. Phosphate Commissioners |
| *Tsingtao* | China Nav. Co. Ltd. |
| *Tulagi* | Burns Philp & Co. |
| *Wangara* | Australian National Line |
| *Wharamui* | New Zealand Shipping Co. Ltd. |
| *Windarra* | J. Bourke Ltd. |
| Supplementary Ships: | |
| *Binburra* | Australian National Line |
| *Delamere* | W. Australian State Shipping Service |
| *Dorriga* | W. Australian State Shipping Service |
| *Dulverton* | W. Australian State Shipping Service |
| *Kabbarli* | W. Australian State Shipping Service |
| *Koolama* | W. Australian State Shipping Service |
| *Mittagong* | Australian National Line |
| *Wongala* | Tucker Shipping Co. |

# CANADA (Information dated 1.3.65)

| Name of Vessel | Owner |
|---|---|
| Selected Ships: | |
| *A. T. Cameron* | Government of Canada |
| *Arcadia* | P. & O.-Orient Line |
| *Athelduke* | Athel Line Ltd., Liverpool |
| *Baffin* | Government of Canada |
| *Beaverfir* | Canadian Pacific Line |
| *Bluenose* | Government of Canada |
| *Camsell* | Government of Canada |
| *Canberra* | P. & O.-Orient Line |
| *Cartier* | Government of Canada |
| *C. D. Howe* | Government of Canada |
| *Cyrus Field* | Western Union Telegraph Co. |
| *d'Iberville* | Government of Canada |
| *Edward Cornwallis* | Government of Canada |
| *Hudson* | Government of Canada |
| *Imperial St. Lawrence* | Imperial Oil Ltd. |
| *Irving Glen* | Glenco Co. Ltd., Bahamas |
| *John A. Macdonald* | Government of Canada |
| *Kapuskasing* | Government of Canada |
| *Labrador* | Government of Canada |
| *Lakemba* | Pacific Shipowners Ltd., Singapore |
| *Letitia* | Donaldson Line, Glasgow |
| *Montcalm* | Government of Canada |
| *Narwhal* | Government of Canada |
| *N. B. Maclean* | Government of Canada |
| *Northern Shell* | Shell Canadian Tankers Ltd. |
| *Oriana* | P. & O.-Orient Line |
| *Port Dauphine* | Government of Canada |
| *Rally* | Government of Canada |
| *Rapid* | Government of Canada |
| *Saldura* | Chr. Salvesen & Co. Ltd., Leith |
| *Silvia* | Saguenay Shipping Ltd. |
| *Simon Fraser* | Government of Canada |
| *Sir Humphrey Gilbert* | Government of Canada |
| *Sir William Alexander* | Government of Canada |
| *Thor I* | A. S. Thor Dahl, Sandefjord, Norway |
| *Thorsriver* | A. S. Thor Dahl, Sandefjord, Norway |
| *Thorstream* | A. S. Thor Dahl, Sandefjord, Norway |
| *Waihemo* | Union S.S. Co. of New Zealand Ltd. |
| *Wolfe* | Government of Canada |
| Supplementary Ships: | |
| *Abegweit* | Government of Canada |
| *Acadia* | Government of Canada |
| *Anna Bakke* | Knutsen Line, Norway |
| *Bonneville* | A. F. Klaveness & Co., Oslo |
| *Bougainville* | A. F. Klaveness & Co., Oslo |
| *Bronxville* | A. F. Klaveness & Co., Oslo |
| *Emerillon* | Shell Canadian Tankers Ltd. |
| *Gosforth* | Federal Commerce & Navigation |
| *Imperial Halifax* | Imperial Oil Ltd. |
| *Imperial Quebec* | Imperial Oil Ltd. |
| *M. J. Boylen* | Kent Line Ltd. |
| *Maxwell* | Government of Canada |
| *Octavia* | H. Daulsberg, Bremen, Germany |
| *Princess of Acadia* | Canadian Pacific Railways |
| *Ragna Bakke* | Knutsen Line, Norway |
| *Sunadele* | Zurich Shipping Co. |
| *Sunnyville* | A. F. Klaveness & Co., Oslo |
| *Sunprincess* | Princess Shipping Co. Monrovia |
| *Thorscarrier* | A. S. Thor Dahl, Sandefjord, Norway |
| *William Carson* | Canadian National Railways |

Auxiliary Ships:
Canada has 25 ocean-going Auxiliary Ships and 33 Auxiliary Ships operating on the Great Lakes.

# INDIA (Information dated 19.4.65)

| Name of Vessel | Owner |
|---|---|
| Selected Ships: | |
| *Amra* | British India Line |
| *Andamans* | Great Eastern Shipping Co. Ltd. |
| *Bahadur* | Asiatic S.N. Co. Ltd. |
| *Bharatmitra* | Bharat Line Ltd. |
| *Bharatratna* | Bharat Line Ltd. |
| *Dumra* | British India Line |
| *Dwarka* | British India Line |
| *Indian Exporter* | India S.S. Co. Ltd. |
| *Indian Merchant* | India S.S. Co. Ltd. |
| *Indian Pioneer* | India S.S. Co. Ltd. |
| *Indian Reliance* | India S.S. Co. Ltd. |
| *Indian Security* | India S.S. Co. Ltd. |
| *Indian Shipper* | India S.S. Co. Ltd. |
| *Indian Success* | India S.S. Co. Ltd. |
| *Indian Trader* | India S.S. Co. Ltd. |
| *Islami* | Mogul Line Ltd. |
| *Jaladhan* | Scindia S.N. Co. Ltd. |
| *Jaladharma* | Scindia S.N. Co. Ltd. |
| *Jaladhruv* | Scindia S.N. Co. Ltd. |
| *Jalaganga* | Scindia S.N. Co. Ltd. |
| *Jalapadma* | Scindia S.N. Co. Ltd. |
| *Jalaprakash* | Scindia S.N. Co. Ltd. |
| *Jalaputra* | Scindia S.N. Co. Ltd. |
| *Jalausha* | Scindia S.N. Co. Ltd. |
| *Jalavihar* | Scindia S.N. Co. Ltd. |
| *Jalazad* | Scindia S.N. Co. Ltd. |
| *Jalajawahar* | Scindia S.N. Co. Ltd. |
| *Kampala* | British India Line |
| *Karanjia* | British India Line |
| *Mohammedi* | Mogul Line Ltd. |
| *Mozaffari* | Mogul Line Ltd. |
| *Nicobar* | Great Eastern Shipping Co. Ltd. |
| *Pradeep* | Department of Lighthouses and Lightships, Govt. of India |
| *Rajula* | British India Line |
| *Santhia* | British India Line |
| *Saudi* | Mogul Line Ltd. |
| *Sirdhana* | British India Line |
| *State of Assam* | Great Eastern Shipping Co. Ltd. |
| *State of Bombay* | Great Eastern Shipping Co. Ltd. |
| *State of Bihar* | Shipping Corporation of India Ltd. |
| *State of Kutch* | Shipping Corporation of India Ltd. |
| *State of Madras* | Shipping Corporation of India Ltd. |
| *State of Maharashtra* | Shipping Corporation of India Ltd. |
| *State of Orrisa* | Shipping Corporation of India Ltd. |
| *State of Tr. Cochin* | Shipping Corporation of India Ltd. |
| Supplementary Ships: | |
| *Akash* | A.P.J. Shipping Co. Ltd. |
| *Ashok Jayanti* | Jayanti Shipping Co. Ltd. |
| *Bharatbhushan* | Bharat Line Ltd. |
| *Bharatkesari* | Bharat Line Ltd. |
| *Gandhi Jayanti* | Jayanti Shipping Co. Ltd. |
| *Indian Endeavour* | India S.S. Co. Ltd. |
| *Indian Industry* | India S.S. Co. Ltd. |
| *Indian Renown* | India S.S. Co. Ltd. |
| *Indian Resolve* | India S.S. Co. Ltd. |
| *Indian Splendour* | India S.S. Co. Ltd. |
| *Indian Strength* | India S.S. Co. Ltd. |
| *Indian Tradition* | India S.S. Co. Ltd. |
| *Indian Triumph* | India S.S. Co. Ltd. |
| *Indian Trust* | India S.S. Co. Ltd. |
| *Jagdoot* | Great Eastern Shipping Co. Ltd. |
| *Jag Ganga* | Great Eastern Shipping Co. Ltd. |
| *Jag Jamna* | Great Eastern Shipping Co. Ltd. |
| *Jag Jiwan* | Great Eastern Shipping Co. Ltd. |
| *Jag Kranti* | Great Eastern Shipping Co. Ltd. |
| *Jag Ketu* | Great Eastern Shipping Co. Ltd. |
| *Jag Laxmi* | Great Eastern Shipping Co. Ltd. |
| *Jag Laadki* | Great Eastern Shipping Co. Ltd. |
| *Jag Manek* | Great Eastern Shipping Co. Ltd. |
| *Jag Mitra* | Great Eastern Shipping Co. Ltd. |
| *Jag Rahat* | Great Eastern Shipping Co. Ltd. |
| *Jag Ratna* | Great Eastern Shipping Co. Ltd. |
| *Jag Shanti* | Great Eastern Shipping Co. Ltd. |
| *Jag Vijay* | Great Eastern Shipping Co. Ltd. |
| *Jaldhnya* | Scindia S.N. Co. Ltd. |
| *Jaladharti* | Scindia S.N. Co. Ltd. |
| *Jaladhir* | Scindia S.N. Co. Ltd. |
| *Jaladuhita* | Scindia S.N. Co. Ltd. |
| *Jaladurga* | Scindia S.N. Co. Ltd. |
| *Jaladuta* | Scindia S.N. Co. Ltd. |
| *Jalagomati* | Scindia S.N. Co. Ltd. |
| *Jalagovind* | Scindia S.N. Co. Ltd. |

## INDIA (*cont.*)

| Name of Vessel | Owner |
|---|---|
| *Jalagopal* | Scindia S.N. Co. Ltd. |
| *Jalagouri* | Scindia S.N. Co. Ltd. |
| *Jalakirti* | Scindia S.N. Co. Ltd. |
| *Jalakrishna* | Scindia S.N. Co. Ltd. |
| *Jalamani* | Scindia S.N. Co. Ltd. |
| *Jalamayur* | Scindia S.N. Co. Ltd. |
| *Jalamudra* | Scindia S.N. Co. Ltd. |
| *Jalapratap* | Scindia S.N. Co. Ltd. |
| *Jalapushpa* | Scindia S.N. Co. Ltd. |
| *Jalaveera* | Scindia S.N. Co. Ltd. |
| *Jalavijaya* | Scindia S.N. Co. Ltd. |
| *Jalavikram* | Scindia S.N. Co. Ltd. |
| *Jalavishnu* | Scindia S.N. Co. Ltd. |
| *Jalarajendra* | Scindia S.N. Co. Ltd. |
| *Jalavallabh* | Scindia S.N. Co. Ltd. |
| *Khrishna Jayanti* | Jayanti Shipping Co. Ltd. |
| *Laxmi Jayanti* | Jayanti Shipping Co. Ltd. |
| *Maha Jag Tara* | South East Asia Shipping Co. Ltd. |
| *Maharaja* | South East Asia Shipping Co. Ltd. |
| *Rajah* | Asiatic S.N. Co. Ltd. |
| *Ranee* | Asiatic S.N. Co. Ltd. |
| *Rama Jayanti* | Jayanti Shipping Co. Ltd. |
| *Ratna Usha* | Ratnakar Shipping Co. Ltd. |
| *State of Andhra* | Shipping Corporation of India Ltd. |
| *State of Gujrat* | Shipping Corporation of India Ltd. |
| *State of Kerala* | Shipping Corporation of India Ltd. |
| *State of Punjab* | Shipping Corporation of India Ltd. |
| *State of Rajasthan* | Shipping Corporation of India Ltd. |
| *State of Uttar Pradesh* | Shipping Corporation of India Ltd. |
| *Visva Jyoti* | Shipping Corporation of India Ltd. |
| *Vishva Kirti* | Shipping Corporation of India Ltd. |
| *Vishva Mangal* | Shipping Corporation of India Ltd. |
| *Vishva Maya* | Shipping Corporation of India Ltd. |
| *Vishva Nidhi* | Shipping Corporation of India Ltd. |
| *Vishva Prabha* | Shipping Corporation of India Ltd. |
| *Visva Prem* | Shipping Corporation of India Ltd. |
| *Visva Shanti* | Shipping Corporation of India Ltd. |
| *Visva Sudha* | Shipping Corporation of India Ltd. |
| *Vishva Usha* | Shipping Corporation of India Ltd. |

## PAKISTAN (Information dated 1.1.65)

| Name of Vessel | Call Sign |
|---|---|
| Selected Ships: | |
| *Al-Husaini* | AQAH |
| *Al-Sayyada* | AQAS |
| *Anwarbaksh* | AQAM |
| *Fatehabad* | AQEM |
| *Kareem* | AQVE |
| *Mustali* | AQLY |
| *Ocean Endurance* | AQBW |
| *Pakistan Prosperity* | AQAZ |
| *Safina-e-Hujjaj* | AQLW |
| *Safina-e-Nusrat* | AQLM |
| *Shams* | AQLN |
| Supplementary Ships: | |
| *Dacca City* | AQEO |
| *Jehangirabad* | AQEN |
| *Ocean Energy* | AQVB |
| *Safina-e-Arab* | AQVA |

Auxiliary Ships:
Pakistan has 16 Auxiliary Ships.

# HONG KONG (Information dated 24.4.65)

| Name of Vessel | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|
| *Anking* | B. McLennan | R. J. Smith, C. E. M. Graham, D. Lee | Leung Shu Fun | China Navigation Co. Ltd. |
| *Anshun* | F. Cunningham | W. F. Jeffrey, P. I. Isherwood, N. R. Masterson | Tsui See Man | China Navigation Co. Ltd. |
| *Changsha* | J. F. O'Connor | C. J. N. Darch, R. D. Keene, M. Williams | Lum A. Gwan Ying | China Navigation Co. Ltd. |
| *Chefoo* | W. Pollock | W. B. Jones, J. A. Derrick, J. N. Edwards | Ma Edmund | China Navigation Co. Ltd. |
| *Chekiang* | V. R. Woolfe | C. G. Cocksedge, N. J. Alexander, B. N. Whitehead | Wai Pun Un | China Navigation Co. Ltd. |
| *Chengtu* | M. R. M. Seale | C. D. Nisbet, D. H. Norcott, G. A. Fairclough | Yue Shiu Ming | China Navigation Co. Ltd. |
| *Chungking* | N. C. Pearson | C. J. R. Metcalf, S. D. Swanwick, J. F. McGlinchey | Li San Kau | China Navigation Co. Ltd. |
| *Cardross* | G. G. Sager | W. J. Stuart, Wong Shu Wa, Chan Chau Po | Tsang Chiu Leong | Kiu Lee Co. Ltd. |
| *Cape St. Mary* | Fu Chiu Wan | Chan Hok Min, Kwok Yung Shing | Wong Kam Tim | Fisheries Department, Hong Kong Government |
| *Dana* | J. Johnsen | R. Rasmussen, G. Knutsen, S. Djonne | A. Gundersen | T. H. Nordboe, Haugesound |
| *Eastern Argosy* | M. I. Groundwater | R. C. Hoggard, G. T. Colbeck, P. R. Thompson | R. Sadler | Indo-China S.N. Co. Ltd. |
| *Eastern Glory* | F. H. Main | D. R. Cole, A. H. Dalton, M. K. Montgomery | D. I. Griffiths | Indo-China S.N. Co. Ltd. |
| *Eastern Maid* | T. H. Nichols | D. N. Greenhalgh, M. Irish, C. P. D. Lyons | F. J. Bateman | Indo-China S.N. Co. Ltd. |
| *Eastern Moon* | R. K. Learoyd | G. Mitchell, P. R. Hay, N. J. Porteous | E. A. Dunford | Indo-China S.N. Co. Ltd. |
| *Eastern Muse* | P. J. Sullivan | J. Hawthorne, K. A. Ashworth, M. J. Kearney | T. W. Bolton | Indo-China S.N. Co. Ltd. |
| *Eastern Queen* | W. J. Bartlett | J. D. R. Witschi, T. M. Muir, M. J. Sawyer | R. G. Brennan | Indo-China S.N. Co. Ltd. |
| *Eastern Ranger* | G. C. Taylor | D. M. Cauvin, D. A. C. Allardice, L. J. Burne | N. C. Watchorn | Indo-China S.N. Co. Ltd. |
| *Eastern Rover* | G. Kinley | R. M. F. Bertram, P. R. Hammond, P. M. Wheeler | R. O. Smith | Indo-China S.N. Co. Ltd. |
| *Eastern Saga* | T. C. W. Marr | J. G. Boyle, G. G. Taylor, P. L. Ballantyne | M. J. O'Brien | Indo-China S.N. Co. Ltd. |
| *Eastern Star* | W. E. Reeve | G. W. S. Ison, A. T. Webb, A. P. Brazil | O. J. O'Brien | Indo-China S.N. Co. Ltd. |
| *Eastern Trader* | M. J. K. Crichton | D. Smith, J. Wroughton, N. A. H. Funston | D. J. Warth | Indo-China S.N. Co. Ltd. |
| *Elsbeth* | C. Y. Tong | R. Richaud, D. F. Woo | T. Y. Wong | Shun Cheong S.N. Co. Ltd. |
| *Fengtien* | R. Kennett | M. Bufton, D. C. Ramsey, W. K. Li | Wong Chi Ngai | China Navigation Co. Ltd. |
| *Foochow* | J. A. McDonald | H. G. Reid, A. M. Allcott, Y. Y. Chan | Sham Yau Tak | China Navigation Co. Ltd. |
| *Fukien* | J. M. K. Kelly | G. M. Adams, R. V. McKay, R. A. Drakes | Tsang Kau | China Navigation Co. Ltd. |
| *Francis Drake* | G. O. Gatehouse | H. M. Wright, R. Cromb, D. K. Loch | J. I. Heggie | Jebsen & Co. |
| *George Anson* | A. R. Dyason | B. M. Curtis, C. R. McArthur, P. N. Bell | D. W. Murphy | Jebsen & Co. |
| *Galle* | D. W. R. Gash | A. C. Walker, Lin Yung Tai, Kwok Ming Yeung | F. Renfrey | Teck Cheong Enterprises (H.K.) Ltd. |
| *Haihing* | O. Schibsted | A. Solbak, N. Kaaber, Ø. Hovland | Chung Yeuk | Norwegian Asia Line |
| *Hai Lee* | H. Yndestad | A. Johnsen, T. Egeland, H. Tjoflot | Kwong Shek Hee | Norwegian Asia Line |
| *Hai Meng* | A. Sjøberg | I. Buer, S. Birkland, B. Egeland | Chan Kam Tsun | Norwegian Asia Line |
| *Halldor* | N. Soelberg | N. Klokk, S. Olsen, R. Fryenlund | Jar Erling Dahl | Norwegian Asia Line |
| *Halldis* | J. Eide | L. Moen, F. Fikse, O. Lauwli | Chiu Tze Kong | Norwegian Asia Line |
| *Hallvard* | E. Nordendal | R. Farstad, A. H. Saterøy, A. Hansen | Lai Kwong Yin | Norwegian Asia Line |
| *Helios* | O. Johannessen | K. Digerness, K. Olsen | Ip Yuk Fai | Norwegian Asia Line |
| *Hermod* | O. Andreassen | O. Stromsness, T. Monsen, E. N. Kristiansen | Poon Chee Pooi | Norwegian Asia Line |
| *Hero* | T. Thorkildsen | R. Pedersen, H. Tjoflot | B. Tangerud | Norwegian Asia Line |
| *Hangsang* | B. O. Jensen | N. J. M. Wilson, Hsu Chien Szu, Lam Kang Yuen | A. M. Bailey | Indo-China S.N. Co. Ltd. |
| *Hosang* | L. C. Cox | M. G. Bishop, A. F. Spaull, Yuen Chok Ying | F. McGuckin | Indo-China S.N. Co. Ltd. |
| *Hoi Kung* | O. Oftedal | B. Vold, I. Torgersen, M. Sjursen | E. Moller | H. M. Wrangell and Co. Ltd. Haugesound |
| *Hoi Wong* | J. Bjerkenes | A. Bjelland, F. Thorsen, B. Lilleland | H. Fastingsen | H. M. Wrangell and Co. Ltd. Haugesound |
| *Jacob Jebsen* | R. A. D. Nielsen | E. Andersen, A. P. Schmidt, V. Kristensen | Lam Bun | Jebsen & Co. |
| *Michael Jebsen* | R. Feldtmann | A. J. Andresen, W. Fabricius, P. Hedlund | Lai Cho Hoi | Jebsen & Co. |
| *Mui Heng* | I. Andresen | J. Hildal, O. Roli, O. Nicolaisen | Lee Hor Chung | Sveen Shipping Co. Ltd. |
| *Kuala Lumpur* | A. Watson | C. R. Humphry, D. W. Boys, B. Keeble | Tam Tin Yiu | China Navigation Co. Ltd. |
| *Kwangsi* | A. Harper | H. J. Stagg, J. L. Simpson, E. Lysons | Shiu Ping Fan | China Navigation Co. Ltd. |
| *Kwangtung* | J. M. Parker | J. Lough, D. R. Groves, W. J. B. Hibberdine | Chan Wing Tsung | China Navigation Co. Ltd. |
| *Kweichow* | R. E. Brooks | M. H. A. Swift, J. R. Stevens, D. A. Daish | Lo Kin Chek | China Navigation Co. Ltd. |

| | | | | |
|---|---|---|---|---|
| *Kweilin* | J. R. Kidd | J. Paisley, I. D. Goddard, B. D. White | Choi Pong Cheung | China Navigation Co. Ltd. |
| *Sinkiang* | M. T. Anderson | J. H. Gomersall, H. Davis, M. J. Pellegrini | Loo Wing Kwong | China Navigation Co. Ltd. |
| *Szechuen* | G. Cornforth | B. W. Bland, J. Milward, D. A. Roche | Wat Kwan | China Navigation Co. Ltd. |
| *Star Alcyone* | E. M. H. Bodensjo | S. O. V. Hellstrom, C. G. Persson, S. O. Berg | B. O. Johnsson | Everett S.S. Corporation S/A |
| *Star Antares* | C. G. Moberg | S. A. Bengtsson, K. Thomsen, L. O. Sandstrom | P. O. Eriksson | Everett S.S. Corporation S/A |
| *Star Betelgeuse* | O. C. G. Warfvinge | T. Wiidik, R. J. Nyblom, P. A. Gustafsson | R. I. Aspenberg | Everett S.S. Corporation S/A |
| *Tai Lung Shan* | C. J. Farren | B. S. Tam, T. F. Cheung, C. Y. Wong | K. W. Au | Sun Cheong S.N. Co. Ltd. |
| *Tai Wah Shan* | A. C. Tai | C. T. Yu, T. Y. Li, K. H. Wong | L. C. Leung | Sun Cheong S.N. Co. Ltd. |
| *Tai Poo Loy* | A. H. Bathurst | W. K. Tin, H. S. Choi, S. C. Hui | K. C. Chan | Sun Cheong S.N. Co. Ltd. |
| *Taiyuan* | J. B. Aldiss | P. S. Fleming, C. J. Coy, G. G. A. Herbert | Ngu Chi Siang | China Navigation Co. Ltd. |
| *Wenchow* | D. Dickson | M. W. England, A. J. Mill Irving, D. R. Walker | Wong Woon Man | China Navigation Co. Ltd. |
| *Waikelo* | H. De Geest | J. G. Ormel, J. J. M. Wasser, Rozaimi Jatim | R. C. Van Krieken | Royal Interocean Lines |



## MALAYSIA (Information dated 15.4.65)

| Name of Vessel | Captain | Observing Officers | Senior Radio Officer | Owner/Manager |
|---|---|---|---|---|
| *Bentong* | I. B. Hunter | A. J. Phillips | Ismail bin Said | Straits S.S. & Co. Ltd. |
| *Bidor* | R. D. Nicolson | Ali bin Hakim | Tan Yeow Kee | Straits S.S. & Co. Ltd. |
| *Hoi Houw* | J. Ekrene | S. Andenes, Fritz Lorck, Ivar Storstein | P. Joubert | Boustead & Co. Ltd., S'pore |
| *Kah Poh* | S. J. Harvey | Budin bin Ahmad, Mohd. Noor bin Lanang | Nik Ismail bin Nik Sar | Ho Chiang Shipping Co. Ltd. |
| *Katong* | J. M. MacNaughton | C. P. Theseira | Low Yoke Kwai | Straits S.S. & Co. Ltd. |
| *Keningau* | N. R. Murray | H. P. Davies | K. A. Menon | Straits S.S. & Co. Ltd. |
| *Kimanis* | W. G. Bradshaw | P. Ho Kia Tuang | S. R. Bharucha | Straits S.S. & Co. Ltd. |
| *Kim Hock* | L. W. Evans | B. Harries | M. Moazzamadal | Guan Guan Ltd. |
| *Kinabalu* | G. Coupar | Liew Kon Kiew | Lee Yeun Fatt | Straits S.S. & Co. Ltd. |
| *Kunak* | H. W. Wilkinson | A. Lockwood | Tan Yee Seng | Straits S.S. & Co. Ltd. |
| *Kuda Mas* | A. B. Durrant | Z. A. McCarthy, Mohd. Sar bin Derus | Leung Chi Chung | Guan Guan Ltd. |
| *Perak* | B. W. Reeve | M. F. James | Ismail bin Manaf | Straits S.S. & Co. Ltd. |
| *Perlis* | R. D. Sidley | G. Solosa | Bobby Pang | Straits S.S. & Co. Ltd. |
| *Cable Enterprise* | P. B. Henderson | G. Aryton, M. Watson, R. Veno | G. O'Brien | Cable & Wireless Ltd. |

## NEW ZEALAND (Information dated 5.4.65)

| Name of Vessel | Owner |
|---|---|
| Selected Ships: | |
| *Kaimanawa* | Union S.S. Co. of New Zealand Ltd. |
| *Kaimiro* | Union S.S. Co. of New Zealand Ltd. |
| *Kaitoa* | Union S.S. Co. of New Zealand Ltd. |
| *Kaitoke* | Union S.S. Co. of New Zealand Ltd. |
| *Kaituna* | Union S.S. Co. of New Zealand Ltd. |
| *Karamu* | Union S.S. Co. of New Zealand Ltd. |
| *Karetu* | Union S.S. Co. of New Zealand Ltd. |
| *Karepo* | Union S.S. Co. of New Zealand Ltd. |
| *Karitane* | Union S.S. Co. of New Zealand Ltd. |
| *Karea* | Union S.S. Co. of New Zealand Ltd. |
| *Kawaroa* | Union S.S. Co. of New Zealand Ltd. |
| *Kawatiri* | Union S.S. Co. of New Zealand Ltd. |
| *Kawerau* | Union S.S. Co. of New Zealand Ltd. |
| *Komata* | Union S.S. Co. of New Zealand Ltd. |
| *Koraki* | Union S.S. Co. of New Zealand Ltd. |
| *Koranui* | Union S.S. Co. of New Zealand Ltd. |
| *Koromiko* | Union S.S. Co. of New Zealand Ltd. |
| *Kowhai* | Union S.S. Co. of New Zealand Ltd. |
| *Kurutai* | Union S.S. Co. of New Zealand Ltd. |
| *Matua* | Union S.S. Co. of New Zealand Ltd. |
| *Moana Roa* | New Zealand Government |
| *Ngakutu* | Union S.S. Co. of New Zealand Ltd. |
| *Ngatoro* | Union S.S. Co. of New Zealand Ltd. |
| *Port Montreal* | Port Line |
| *Saracen* | Crusader Shipping Co. Ltd. |
| *Tarawera* | Union S.S. Co. of New Zealand Ltd. |
| *Tofua* | Union S.S. Co. of New Zealand Ltd. |
| *Waikare* | Union S.S. Co. of New Zealand Ltd. |
| *Waimate* | Union S.S. Co. of New Zealand Ltd. |
| *Waimea* | Union S.S. Co. of New Zealand Ltd. |
| *Wairata* | Union S.S. Co. of New Zealand Ltd. |
| *Wairimu* | Union S.S. Co. of New Zealand Ltd. |
| *Waitaki* | Union S.S. Co. of New Zealand Ltd. |
| *Waitemata* | Union S.S. Co. of New Zealand Ltd. |
| Supplementary Ships: | |
| *City of Auckland* | Ellerman & Bucknall S.S. Co. Ltd. |
| *Holmburn* | Holm & Co. |
| *Taranui* | South Pacific Shipping Co. (Suva) |
| *Knight Templar* | Crusader Shipping Co. Ltd. |

Auxiliary Ships:
New Zealand has 10 Auxiliary Ships.

## ERRATA

*The Marine Observer*, January 1965, photographs opposite pages 32 and 33, caption:
*for* (see page 37) *read* (see page 38)

*The Marine Observer*, January 1965, p. 38, details of photograph No. 4, top line:
*for* 53° 46′N, 6° 48′W *read* 53° 46′N, 6° 48′ E

*The Marine Observer*, April 1965, p. 75, line 9 from foot of page:
*for* Assistant Director (Organisation and Methods) *read* Assistant Director (Observatories and Micrometeorology).

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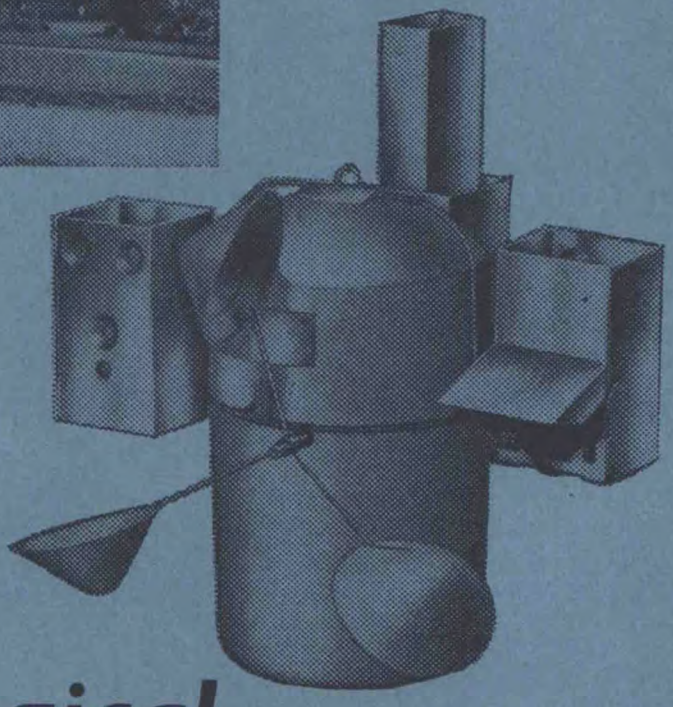

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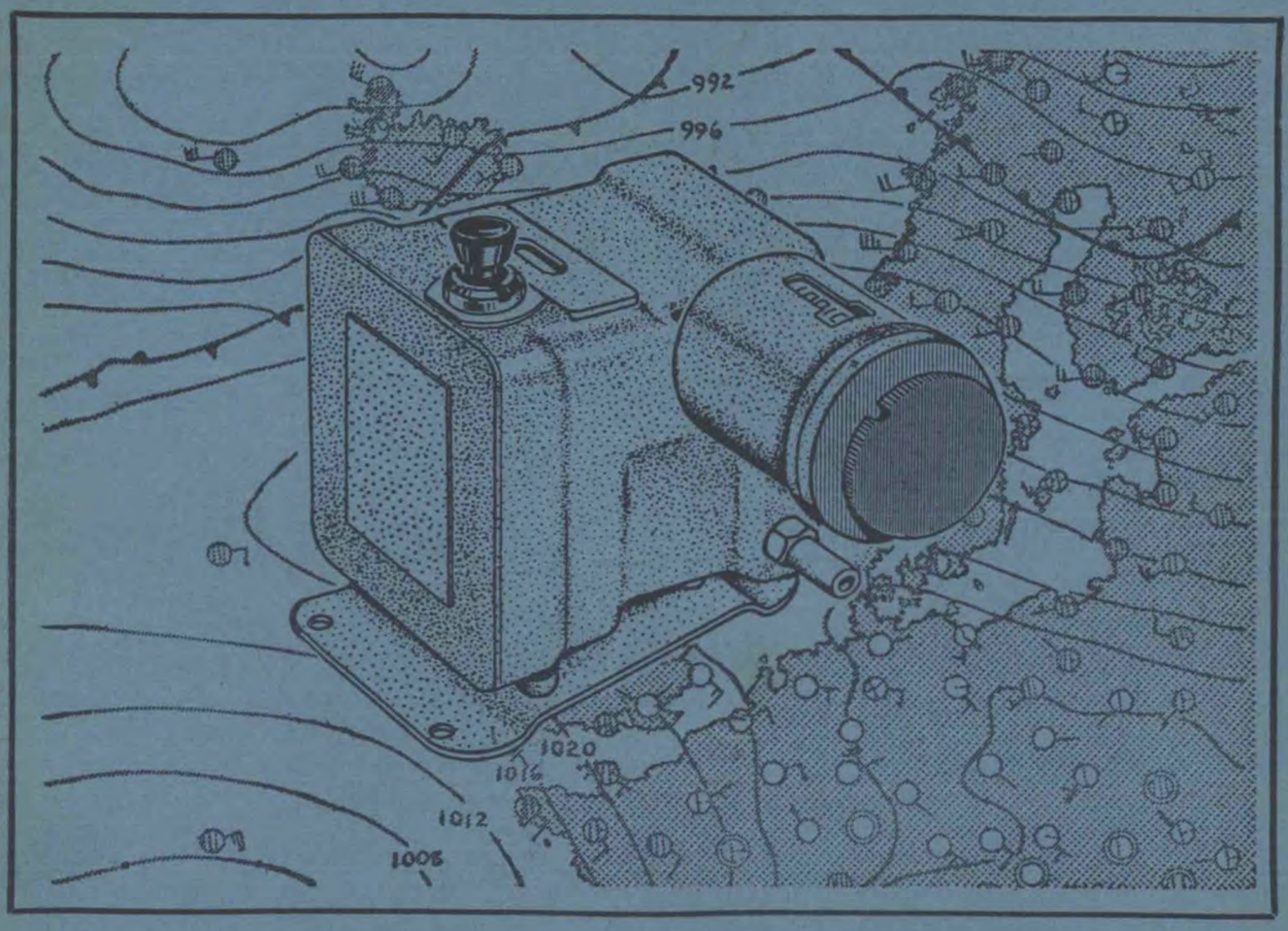
*The WB Radio Sonde can be supplied either complete with battery, aerial parachute, radar reflector and battery, or the transmitter with met. elements can be supplied as a single unit.*

**WHITELEY ELECTRICAL RADIO COMPANY LTD.**

MANSFIELD - NOTTS - ENGLAND

# MECHANISM PRECISION ANEROID BAROMETERS WITH DIGITAL READOUT FACILITATE WEATHER REPORTING

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RANGE: 900 to 1050 mb. DISCRIMINATION: 0·02 mb.
ACCURACY: At 20°C, ± 0·3 mb. At 5°C & 35°C, ± 0·5 mb. Max. change.

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MECHANISM

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